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Diary of an Excursion to the Shatool and Boorun Passes over the Himalaya, in September, 1845. *By Captain* Madden, *Bengal Artillery.*

The writer of the following notes has been induced to commit them to paper, in the hope of their proving interesting, from the fact that a portion of the route traversed is comparatively little known, and so far as published information is concerned, is nearly new ground in botany; though of ornithological and entomological tours, several have appeared from the pens of Captains Hay, Hutton, &c. The tract in question is scarcely ever quoted for plants in 'Royle's Illustrations,' and the writer is therefore induced to believe that the new habitats here given, may not be without their use to some of the many travellers, who now annually cross the Himalaya, from Simla to Kunawur. To those amongst them who are novices in the mountains, he would recommend attention to the following particulars, as tending considerably to remove the difficulties, and enhance the pleasures of the trip.

1st. Avoid forming a party of more than three, in consequence of the difficulty, increasing in a geometrical ratio, of obtaining supplies and porters for a greater number.

2nd. Change the latter daily; one may thus halt at pleasure without expense, when desirable; the rate of payment is only three annas per diem instead of four, as near Simla, and the difficulty, often a serious one near the snowy range, is obviated of procuring large supplies, and of adjusting the fair rate to be paid for them; a frequent source of angry

and interminable discussion. It is also advisable to secure the coolies from fraudulent deductions by paying or seeing them paid in person. A heavy bag of pice is useful in many villages, where the inhabitants cannot often produce change for a rupee.

3rd. Encumber yourself with the least possible number of servants; but let these be able-bodied, in sound health, and warmly clothed; their falling sick will cause much delay and inconvenience: and on no account start without a small tent for their use.

4th. Let this tent (and your own) be only of such a weight that one strong man can carry it well, even when soaked with rain; and to effect this the better, let each of the party have his own tent.

5th. As the heat in the low vallies is very great, take some light clothing, and a copious sola-feather hat. If inclined to hepatitis, a doubly-lined umbrella is indispensable; and a green gauze veil or pair of goggles to protect the eyes from the glare of the snow, especially in spring: many have been temporarily blinded from this 'cause defective.' The traveller should avoid the vallies as much as possible; many of them are infested by flies of which the bites are exceedingly poisonous, and when irritated, terminate in dangerous sores. A double wax-cloth, to keep one's bedding dry, is essential, and five times as many pairs of shoes as you would expend at Simla in an equal period. The country-made articles sold in the shops there, will not, particularly during wet weather, stand more than a hard day's work on the rugged paths of the interior; and in the end, the purchase of European shoes will be found to economize cash, space, and skin.

6th. Let your cups, jugs, plates and dishes be of metal; with these only may you defy fate and falls; and as for provender to adorn them, an ample supply of tea, sugar, Carr's biscuits, hermetically sealed soup and bouilli, fowls, sliced bread re-baked into everlasting rusks, with a liberal allowance of beer, wine, and brandy, the latter precious article insured against damage by being decanted into curaçoa or other stone bottles. Nor lastly, must a liberal proportion of tobacco be excluded from the category; be assured Molière was not far wrong when he said 'Quoique puisse dire Aristote et toute la Philosophie, il n'y a rien d'égal au tabac'—at all events when jaded by a severe walk, and all other creature-comforts out of sight. Amidst the fulness and listlessness of Simla, one may dispense very stoically with many of these things, but

after the hard exercise and keen air of the mountain tops, nature asserts her rights, and speaks through the stomach, in tones which can be neither mistaken nor denied. The direction of the journey being determined before-hand, much trouble and expense will be saved by the establishment of a depôt at some convenient spot on the return route.

7th and last. Some quarter of a century since, Stalker, Welsh, and other out-fitters used to furnish the innocent Cadet with certain pounds of tobacco to be given to the sailors "for doing little jobs;" such, as well as presents of coarse powder and small shot—will be found really serviceable in the Himalaya, where they are all scarce and bad. A judicious exhibition of these coveted articles will often secure a cheerful endurance of cold, wet, danger, and fatigue; the fumes of the tobacco stimulating the sensorium of the mountaineer, as those of loyalty and chivalry do, or did, that of the Frenchman. It is needless to add that the contrary method of abuse, blows, and violence, irrespective of its immorality in contravening the expressed will and orders of our honourable and honoured masters, is almost sure to defeat its intention, and to lead to the desertion of those subjected to it.

September 3rd.—Left Simla with Lieutenant Bourchier, of the Artillery, and walked to Fagoo, distant eleven or twelve miles, in four hours and forty minutes. The rocks at Simla are chiefly clay and mica slate, with quartzose sandstone towards the west, and a crystallized limestone at Jutog; the road lies along the northern face of Jaka mountain, which is here composed of a deep-blue clay slate, and not of limestone, as erroneously stated by Captain A. Gerard. The forest is here chiefly formed by the Ban oak (Quercus incana); and in the steep precipitous ravines to the right, grows abundantly the Deutzia Brunoniana, which bears a considerable resemblance to the common Syringa. Quitting this, the road gradually ascends the south or bare side of the ridge which connects Jaka with Muhasoo: the north side is covered with a forest of Mohroo oak (Quercus dilatata): and at 8 or 9 miles from Simla, the summit of Muhasoo is attained, upwards of 9,000 feet above the sea; the route is latterly through a fine forest of cedar, Rai (Abies Smithiana), and the Kreoo or Kurshoo oak (Quercus semicarpifolia), and descends to Fagoo, 700 feet below, through beautiful hanging woods of maple, pindrow, or Jhunera pine (Picea pindrow), horse chestnut (Pavia

indica), below the road, and a multitude of shrubs, Viburnums, Leycesteria formosa, Limonia laureola, black currant, &c., under which in May and June, the large pure white ladies' slipper (Cypripedium cornigerum) flowers in abundance. The Putees (Aconitum heterophyllum), Circæa cordata, and the blue-flowering chereyata (Halenia elliptica) are also both common on Muhasoo and at Fagoo. On the pleasant downs behind this latter, the Primula denticulata, the sundew (Drosera muscipula), Viola cœspitosa, and the pretty little eye-bright (Euphrasia officinalis), are all common, though less so than in the interior.

To the resident of Cawnpore or Ferozepoor, nothing can be more delicious than the freshness of the Fagoo woods in spring. The lofty stems of the pines are enveloped by the huge ivy and Ampelopsis climbers; and in the autumn, when the leaves of this last turn bright red and copper, the effect is very rich, and is said to resemble that produced in the North American woods by species of oak, maple, and sumach. All our oaks here are evergreens. The Tree-Rhododendron and Andromeda, which cover whole mountains of the outer ranges, become rare at Fagoo, and are seldom met with in the interior: so very limited in width is their favourite belt. They are however abundant on the Sutlej between Seran and Tiranda. The boiling point of water is 198° at Fagoo.

September 4th.—Detained for coolies; all those available being secured for Prince Waldemar and suite proceeding to Simla, and Colonel Fullarton and his party bound for the Roopin Pass.

September 5th.—To Puralee, ten miles, in four hours; the first seven miles, as far as Synj, are for the most part a steep and uninteresting descent to the Girree; the Morina wallichiana, which flowers in May and June, and the Scutellaria angustifolia are common. The glen of the Girree is so warm for most months of the year, that it is advisable, if practicable, to descend in the afternoon and merely pass the night in it; but fishermen will run all risks, and there is said to be good fishing ten miles lower down. Puralee is about two and a half miles up the valley from Synj on the same bank of the river, which, between these villages, forces its way through a deep rocky defile on the brink of which the road is carried for half a mile. There is a good breadth of arable land in this part of the valley, and the climate being very warm, the products are nearly those of the plains—barley, wheat, kodab

(Elensine coracana), cheena (Panicum miliaceum), till (Sesamum orientale), and various species of Phaseolus. Puralee boasts a small bungalow of one room, which is cooler than a tent, but by no means so clean, being infested with almost all the insect plagues of Egypt.

September 6th.—To Kotkhaee, twelve miles, which we walked in five hours ten minutes. The road lies for three miles or so, up the right bank of the Girree, and then crosses by a good Sanga to the left bank, along which it continues for the rest of the route in a constant and rather wearisome series of ascents, descents, and sinuosities. Kotkhaee, "the Fort of the Fosse," is a picturesque spot at the junction of several streams from the east and north, which first here give the Girree the character of a small reach, about the same size as the Hosilla in Kemaon, and like it rising short of the snowy range. The thermometer boils here at 202°, which gives about 6,000 feet elevation, about 500 more than is generally allowed to Kotkhaee. An excellent bungalow of two rooms had just been finished by Mr. Erskine, 150 or 200 feet above the left bank of the river. Across the stream, on a precipitous rock at the angle formed by the Girree, and a stream from Huttoo, is "the palace" of the Kotgooroo chief; it is an emblem of his own mind, being a ruin, which only shines under the brush of the painter. Consequent on the imbecility of the chief, the district has long been under British management. A clump of cypress (Cupressus torulosa) grows in the vicinity of the palace; the other trees are chiefly Kail pine (Pinus excelsa.) On the route to-day I noticed in the corn fields abundance of the pretty Hibiscus trionum, for which Dr. Royle goes as far as China. A species of Vicia, resembling V. cracca, is common amongst the thickets. Considerable quantities of iron are smelted at and around Kotkhaee, and conveyed on mules to Simla and the plains.

September 7th.—To Deorah or Dehrah, about twelve miles, in five and three-quarter hours. Three miles from Kotkhaee the road crosses to the right bank of the Girree, and then leaves the glen to ascend the Shunkun Ghatee, over the high neck joining the Koopur mountain on the SE., with Toombroo and Huttoo on the left. The Pass is probably from 9,000 to 9,500 feet above the sea, and on the ascent occur Abies smithiana, Picea pindrow, and in considerable numbers, Populus ciliata: this I find, the natives of the plains invariably mistake for the peepul. If the word *populus* comes from peepul, it would go to prove that the separation of

the Latin nations from the Hindoos took place after the establishment of the latter in India; the peepul not being known in the high countries to the north, whence the Hindoos are supposed to have emigrated. The converse may indeed be true, that the northern tree is the original peepul. On the grassy summit of the Pass, the Morina longifolia, the Sibbaldia procumbens, &c. are in abundance. From this point the source of the Girree may be seen to the right, at about 10,000 feet elevation on the Koopur mountain, below which the stream penetrates by a deep rocky and wooded chasm, a spur from Koopur which would otherwise turn it down by Deorah to the Pabur. The locality is well worth a visit, especially following the Chumba range from Bulsun and Puthernulla. A little beyond Koopur, and connected with it by the Puthernullah Pass of the map, is the still loftier three-peaked range in the Tiroch territory, called Kunchooa; the Urrukta ridge of Royle and Fraser, an appellation apparently taken from a fort now dismantled, and scarcely known to the present inhabitants. From the presence of birch, silver-fir, Anagyris barbata, &c. the Kunchooa summits are probably little under 12,000 feet elevation; there is a difficult route over them from Deorah to Choupahl *viâ* the Puthernullah Pass of the map. The view is fine from the Shunkun Pass, including the Jumnootree peaks to the east, the Choor, Shallee, Huttoo, Fagoo, &c. The Koopur mountain is composed of gneiss rock, like Huttoo; but the Shunkun Pass is of a decomposing micaceous shale, down which the road, some times steep and rocky, proceeds for four or five miles to Deorah, which is seen directly beneath. Deorah, often called simply Durbar, is the residence of the Rana of Joobul. The last Chief, Poorun Chund, was drugged to imbecility by his Wuzeers, in order to ensure the management of the country remaining in their own hands; this policy failed, as our Government assumed and still retains the management; but the legitimate claimant, an intelligent boy of eight or ten, is promised the restoration of the Raj when he attains his majority. His palace is an extensive and lofty square pile, surmounted by turrets, slated in the concave Chinese style, not uncommon in the Himalaya; it is picturesque and has often furnished a subject for the tourist's sketch book; the best view is from the Sarec road. It stands from 6,000 to 6,400 feet above the sea, the thermometer boiling at 201½°, and being surrounded by high mountains, is rather a warm spot. But the traveller has the advantage

of a small bungalow, the last on the route to the snowy range. Here commences the rice cultivation so general in the valley of the Pabur. Bathoo (Amaranthus anardana), kodah, cheena, and tobacco, are also cultivated. The country is fertile and populous; the neighbouring mountains, especially to the south, where a long and lofty spur from Koopur extends to the Pabur—are beautifully diversified with fields, thriving villages, and pine forests, chiefly of Kail, the only species at Deorah.

September 8th.—To Rooroo Kothee in four and three-quarter hours, called fourteen miles in the route book, but perhaps not above twelve. Soon after leaving Deorah, the road enters the domain of the Ranee of Syree, leading down over gneiss rock, along the left bank of the Beeskool river, which rises from the Koopur mountain. Its banks are regularly fringed with elder trees (Alnus obtusifolia) here called *Koonch*, the *New* of Kunawur. Saree is about half-way to Rooroo, and is the lair of an old Ranee, once famed for her beauty, and now for litigation with her neighbours, and oppression of her people. The old lady visited Calcutta about 1822, where I saw her on a visit to the late Sir Robert Stevenson. From near Saree, which is a poor hamlet, the Pabur river is first seen, with the Beeskool flowing into it, through some flat alluvial ground by Goonsa village. Across the Pabur, on a nearly isolated hill perhaps 500 feet above it, stands the fort or castellated mansion of Raeengudh or Raeengurh, once a Ghoorka, then a British post, and since ceded to the Rana of Kyoonthul in exchange for Simla. Far above the fort, from amidst a group of minor mountains of very picturesque outline, spring the richly wooded peaks of Boorhun and Godar Deotah, to the height of nearly 9,000 feet above sea level, a branch of the Changsheel—or as it is here softened, Chaheel range. The road descends by easy gradations to the level of the Pabur, and crossing the Nye, Noye, Pursrar or Dogra, a tributary from Thana Keeshain, continues along or near its right bank to Rooroo, a few hundred yards short of which, it crosses by a Sanga, or wooden bridge, a rocky narrow chasm, ninety-nine feet deep, through which flows the Shikree Nuddee. The Pabur is here a fine, strong, and perfectly clear river, occasionally forming formidable rapids. A species of trout is abundant in it and in the Shikree, but is said to be prevented by the snow water from ascending more than ten or twelve miles higher up. The cliff

section of the Shikree exhibits strata of a micaceous sandstone, but Rooroo, Chergaon, and several other villages on the Pabur, stand on elevated plateau of gravel and boulders, from 100 to 150 feet above the present level of the river. These are chiefly devoted to riee cultivation, for which this valley, here and upwards, known as Chooara, is celebrated; the fields are abundantly, and to the traveller often ineonveniently, irrigated by rills skilfully led along artificial euts from the Pabur, originating at a sufficient distance above to admit of the highest levels being watered.

Rooroo Kothee is 5,200 feet above the sea, and is rather a hot plaee. The barley ripens in the latter half of May, the wheat in the first half of June; the heat is then exeessive. It is not a very large village, and has a kind of square in the eentre, which, were it a little cleaner, would remind one of a substantial farm-yard in England. The Muhunt or Chief Gooroo of Busehur resides here, and has large endowments in land. Owing to the neglect of the smooth-tongued Mookheea of Deorah, who promised everything and performed nothing, our baggage did not arrive till sunset, so that our breakfast and dinner merged into one, at ½ past 7 P. M., thirteen hours after leaving Deorah; a place which eeonomizes cash better than temper. During the day, a general assembly of the mountaineers took place under the Gooroo's auspices, for the purpose of dancing round the gods. These, however well-gilt, appear to be aired and ventilated but onee a year, and were deposited in litters beneath the trysting tree in the village square, round which the people formed themselves, men and women apart, into seven squares, single rank of eight or ten each, holding eaeh other's hands, extended behind their backs: then by a curious and by no means inelegant step, or set of steps, in exeellent time, they gradually completed the eircuit, the movement being combined with others to the front and rear, with repeated bowings in concert to the deities; this continued the best part of the day to the musie of pipe and drum, the performers being oeeasionally relieved from the surrounding crowd, all seeming equally adepts. Considerable praetice must have preceded so ereditable an exeeution of this danee, and once or twiee the gods even joined in the fun, which then grew more fast and furious than ever; and from the exeeeding elastieity of the ash-poles on whieh they were carried, "their worships" got such a shaking as gods in the plains ean never hope to enjoy.

The mountaineers of the Himalaya, like those of Gilead, invariably convert the letter *s* into *sh*: so that the Shibboleth test must be reversed to detect a Paharee; they have also retained in common use a great number of Hindooee words, which are seldom heard in the plains.

Rooroo Kothee is situated about 150 feet above the right bank of the Pabur, which, at this season is fordable here with difficulty. In common with similar valley sites in the mountains, the village is infested with a small species of fly, which, without giving any notice, inflicts a bite that is frequently attended with much irritation. The higher mountains have also in the spring, their pest, in the shape of a large gad-fly, a pitiless enemy of man and beast.

The low glen of the Pabur, while it boasts abundance of the Rosa brunonis, Indigofera dosua, Hypericum cernuum, Deutzia staminea, and other flowering shrubs, possesses few or none of the beautiful herbaceous plants of the Alpine rocks and pastures. The Marvel of Peru (Mirabilis jalapa) however, grows in the greatest abundance and luxuriance about Rooroo and several other villages, as well as about Kotkhaee on the Girree, and on the outer range about Barh and Kalka; the climate of the Himalaya between 4,000 and 7,000 feet elevation, brings it to such perfection that in all these places it is so completely naturalized as to appear wild. Another American plant, the Martynia diandra, is equally abundant near villages in the Turaee of Kemaon towards Bhumouree. The Hypericum perforatum is a common shrub in the cornfields of the Pabur and Girree vallies; and on the rocks near Rooroo and Deorah, I noticed the Linaria incana, resembling in habit the L. cymbalaria of Europe. Desmodium tomentosum is also a common shrub on the rocks in the Pabur valley hereabouts, and on the Sutluj above Wangtoo bridge, preferring the warmest exposures.

There is an interesting route of three marches, from Rooroo Kothee *vid* the Shikree Nudee, and over the Moraul ka Dunda, to Rampore on the Sutluj, halting at Samurkot and Neura (or Neheree.) The country is well peopled, and beautifully varied with forest and cultivation. In May and June nothing can exceed the beauty of the wild roses, (R. Brunonis) climbing up the dark pines and alders, and falling down in splendid festoons of the most fragrant blossoms. Snow will be found early in June on this route, when the heat at Rampore, immediately below is almost intolerable.

September 9th.—To Chergaon, an easy stage of ten miles up the right bank of the Pabur, which we walked in three and a half hours. The current of the river becomes more and more furious as we approach its source in the Boorhun Ghatee; and in several places, dashes along with the greatest noise and violence amongst the granitic and other boulders, which lie in its bed.

"Vexed Scylla and the sea that parts
Calabria from the hoarse Trinacrian shore,"

are smooth water compared with it even in poetry; for it must be acknowledged that in reality these classic rapids are wonderfully calm and gentle. After a few miles, the road passes under a high range of slaty mountains of a curious formation, presenting an appearance more like a series of gigantic pine-apples or cheeses, than any thing else I know of. This is owing to the inclination and interruption of the strata, which on one side present steep faces of shattered rock, while the reverse side of the hummocks, though steep, is covered with grass. There are no trees on these mountains, exposed as they are to the withering influence of the southern sun; the Desmodium tomentosum is, however, abundant, and the Capparis nepalensis creeps in patches along the face of the sunny cliffs. About eight miles from Rooroo, we passed the village of Mundlee, held in free gift by Brahmans, but also inhabited by a colony of Moosulmans, whose ancestors emigrated here from Jounpoor, three or four generations ago. They still possess the true faith and a supply of fowls and eggs. This is properly the first village of Chooara. The land is here almost wholly devoted to rice, which will be ripe in October: till, koolthee, mash, &c. are still sown, but not in any quantity; and in spring, the poppy is rather largely cultivated. Across the river on a spur from the mountains stands the romantic fort of Butolee, near a large village called Musoola; above these rise the densely wooded flanks of the Changsheel range, facing the north, and in full contrast to the mountains on the right bank, covered with forests of pine (Pinus excelsa, Abies smithiana,) &c. Should the traveller prefer it, he may, if bound from Simla to the Roopin Pass, strike up from the glen of the Pabur at Raeengurh, and follow the summit of the Changsheel range to Doodoo. This route is much cooler and more interesting than that by Rooroo; but there are no villages, and two or three days supplies, a good map, pocket compass, and guides from

Mandil village, are indispensable. A little above Butalee, the Pabur receives on the right bank the Mutretee river, from the Moral ke Dhar, consisting of lofty, broken, glacis-like ridges, the strata lying over towards the Sutluj, and probably rising to 13,000 feet. It is the continuation of the Shatool range, and divides Chooara from Dusao. By fording the Mutretee at a mill in the line of the Pabur, a considerable detour to the bridge up to its glen and a subsequent ascent of several hundred feet may be avoided; the short cut keeps close to the Pabur, but it requires a steady head to pass in safety some narrow ledges of rock, against which when the water is high, the current sets strongly, and none should then attempt it, who cannot depend on their nerves. On our return, the Pabur had fallen considerably, and we effected the passage without further inconvenience than what arose from the chilly waters of the Mutretee, which must be forded. About two miles on is Chergaon, a small and poor hamlet, about 6,000 feet above the sea, in the angle formed by the junction of the Undretee or Indravutee river with the Pabur. This impetuous torrent which is about equal in size to the Pabur, pours down south from the Shatool Pass; the bridge having been carried away, we were forced to cross its angry waters by a single tree, which my companion did unaided, while I was glad to accept the assistance of a neighbouring miller. Al-sirat itself could scarce be more narrow, or destruction more certain in the event of a slip. Chergaon is well supplied with apricot and other fruit trees, and the brink of the Pabur is shaded by alder, &c. The Toombroo peak, north of the Shunkun Ghatee, erroneously written Toongroo in the maps, is a conspicuous point from Chergaon down the glen of the Pabur.

September 10*th*.—To Moojwar village in Rol, twelve miles, a fatiguing march, during which we accompanied our coolies, who halted liberally to rest and smoke, so that we were eight hours on the road. For three miles the path lies through rice cultivation and brush-wood, up the left bank of the Undretee; then crosses and ascends about 500 feet to Dugol, a Brahman village of eight or ten families on the right bank, but in the map erroneously placed on the left. It is reckoned 6,800 feet above the sea, but the warm clothing of the inhabitants indicates a much colder climate than would be due to such an elevation nearer the plains. The holy fathers are small, well made, well clad men, but being afflicted with the itch, accompanied us to Rol for medi-

cine, of which, by the way, every traveller should carry a small supply to meet the demands, which will be almost daily made by patients suffering from liver, spleen, dysentery, and in short all the ills that flesh is heir to, save blue cholera; and if unflinching faith in the skill of the physician be conducive to a cure, the practitioner here should be successful indeed, for not Æsculapius himself was invested by the Greeks with more certain healing powers than is every European—however modest his pretensions in this department—by the mountaineers. From Dugol, the path again descends to the river, and for two or three miles keeps near its bank through beautiful English-like woods of elm, poplar, alder, cornel, (Cornus macrophylla) and birch (Betula cylindrostachya,) with Abies smithiana on the heights. A little beyond Dugol, I found by a stream a species of Eupatorium in flower, much resembling E. cannabinum. We next recrossed to the left bank and followed it for several miles by a path often bad and rocky, and impracticable to ponies; the scenery is very wild and beautiful, the Undretee forming here, and indeed throughout the march, a series of foaming rapids: it is quite unfordable. We now once more recrossed to the right bank, and in a mile or two reached the junction of the two streams which form the Undretee—viz., the Byansoo from the left, the Sheear from the right, both flowing down from bare russet-coloured ridges, far above the region of forest, and evidently buried in snow for three-fourths of the year. The Byansoo, I believe, originates in the Jalsoo Pass, about 13,000 feet high, which affords a passage to Seran on the Sutluj. We finally gained the left bank of the Byansoo by a fallen spruce, and ascended the fork between the streams by a long and steep ascent to Cheechwar, one of the Rol group of villages, 8,600 feet above the sea, a pretty large and well-built place, one and a half or two miles above which, by an easy acclivity, we reached Moojwar. A blue aster, quite similar to the Swiss A. alpina; a large and handsome Inula by rivulets, (I. royleana?) the Parochetus oxalidifolia, the large-leaved elm (Ulmus erosa?) much like the Wych elm, here called Mored and Paboona, affording much fodder to the cattle, with the walnut, peach, and oak, (Q. semicarpifolia), are common in this district. Across the Sheear to the east, the mountains present a lofty precipitous front to the west, clothed with spruce and cedar. Across the Byansoo to the west are more bare, brown, and very rugged mountains. On the north, the Shatool is con-

cealed by rising land, but so far as one can see, the great range here is deficient in the magnificent cliffs and crags of the Roopin and other Passes to the eastward, but one is not yet high enough to judge fairly. Moojwar is about 9,000 feet above the sea; the houses large, of two stories, very substantially constructed of stone and timber. The cultivation is chiefly Bathoo (Amaranthus anerdana,) and Phaphur or Buckwheat, with a little tobacco. The climate is severe and capricious, and the people seem to consider the passage of the Shatool by no means a trifle, and, as we afterwards found, endeavoured to intimidate our people by the threat that not one of them would ever return; nor was a storm of rain and thunder in the afternoon, much calculated to encourage them. The villagers have, however, agreed to accompany us, and promised to have supplies for three days all ready in the morning. They are said to have been recently implicated in a foray on their neighbours beyond the next ridge whose sheep to the number of 1,500 they carried off after the manner of Rob Roy and his Caterans. There is *no king* in the land, and every man does that which is right in his own eyes.

September 11th.—To Kala Koondar, ten or eleven miles, which took us eight hours, being much delayed by the constant halts of the coolies, by my own rests and search for plants, and, after quitting the forest, by a very difficult path. The distances indeed are but approximations, and are perhaps exaggerated; experience has shown that to the direct map-distance about one-third must be added for the road-distance, instead of one-seventh as in the plains; but Kala Koondar, and the next two stages, being "vox et præterea nihil" are not inserted on the maps. Soon after leaving Moojwar, we passed the hamlet Jutwar, the last and highest (9,200 feet,) on the route. Brush-wood and meadows succeed, the first formed by Rosa sericea (a 4-petalled white species,) Berberis brachybotrys (with bright red fruit,) and abundance of the beautiful yellow Potentilla dubia; while the pastures abound with the sessile flowered Iris kemaonensis; all these plants are equally characteristic of the corresponding sites above Junglig and Jaka near the Boorun and Roopin Passes. The late Dr. Hoffmeister shewed me specimens of the above Potentilla, if they were not varieties of P. atrosanguinea, gathered at and above Chitkool on the Buspa, in which some of the petals were yellow and some carmine. On quitting the

meadows, the route enters and ascends steeply through a forest of Abies smithiana, Pinus excelsa, Picea pindrow and P. webbiana, Quercus semicarpifolia, Taxus baccata, Ribes acuminatum (red currant) the lemon-scented Laurustinus (Viburnum nervosa,) Rosa sericea, &c., none of the trees remarkable for size. The Picea pindrow and P. webbiana are here and at Jaka, confounded under the name of Kulrai, perhaps the Chilrow of Royle, and these unconscious disciples of Lamark insist, that the difference in the size and colour of their leaves is solely owing to the inclemency of the wind and weather, on the exposed sites where the Webbian species is found. We emerged from the forest at a spot called Bhoojkal, 11,700 feet above the sea, and about three miles from Moojwar; the rest of the day's journey lies along the east or SE. exposure of the mountains, destitute of trees, but covered with a new and rich series of Alpine plants. A little beyond Bhoojkal and on the same level, Reoonee, sometimes used as a halting place but a very bad one, occurs; and hereabouts much ground is lost by several steep descents to torrents by rather dangerous paths. Above, to the left, the mountains exhibit bare, but not precipitous shelves of gneiss rock, inclined from the route; to the right are deep glens, woods, torrents, and a few beds of snow, all wild, lonely, and sublime. Kala Koondar is an open but steep spot in a grassy, flowery glen, facing south, about 300 feet above the forest, and 12,000 above the sea, on a level with the Choor summit, which is visible to SSW. We encamped amidst heavy rain and hail from the north, which rendered the grass very cold and wet for our people and ourselves too, having been compelled for want of hands, to leave our charpaces on the road to-day. In these difficult tracts a good tarpaulin under one's bedding is much more conveniently carried than a bed-stead, and excludes the damp almost equally well; where both are absent, a very excellent substitute is a thick layer of pine or yew branches.

The creeping juniper, here called Theloo but in Upper Kunawur Pama (Juniperus squamosa), commences from 800 to 1,000 feet below Kala Koondar. The open pastures are covered with a profusion of alpine flowers among which are the Cyananthus lobata (called Kheeree), the Dolomiœa macrocephala (Dhoop or Googul), Saxifraga parnassiæfolia (or a species very like it, also found on the Choor), and (on rocks) Saxifraga mucronulata, Sieversia clata, Swertia cœrulea and several other species, (one, a large plant with pale blue blossoms is probably

Royle's S. perfoliata), the Sphelia latifolia of Don, Polygonum molle (or polystachyum), brunonis, and vacciniifolium, (the last on rocks, a beautiful species), Loniccra obovata, Senecio nigricans, Achillœa millifolia, a yellow Tanacetum, Oxyria elatior, Sibbaldia procumbens, Spiræa kamschatkika, (very like meadow-sweet), several Sedums; Morina longifolia, Caltha himalensis, Delphinium vestitum, Aconitum heterophyllum, Phlomis bracteosa, Corydalis govaniana, Geranium wallichianum, Picrorhiza kurrooa, and many more. Rhododendron campanulatum, is common in the region of birch, and is called Chumreesh, Simreesh, Simrat, Simbur, &c.; and above it is the much smaller Rhododendron lepidotum or anthopogon with aromatic leaves, smelling when bruised like those of walnut; it is called Talsur. The capsules are in dense terminal clusters, and the flowers are said to be red. Gualtheria trichophylla with its beautiful azure fleshy calyx abounds on the sunny banks. The above are so general in all the region above the forest on the Snowy range, that it will be needless to specify them on every occasion. The Cyananthus lobata covers extensive tracts with its blue (occasionally white) periwinkle-like flowers; at and above Nooroo Bassa on the north side of the Roopin Pass, I found the seed ripe on the 20th of September, while lower down, the plant was still in full bloom. In the same way, on the Changsheel Range, Morina longifolia was all ripe on the 25th September, while on the 30th, it was still in full flower on Huttoo. Rhododendron arboreum flowers in February and March at 7,000 feet, and is not ripe till Christmas; but R. campanulatum and anthopogon (Talsur) which flower in May, June, and July, at 12,000 feet, are ripe by the end of October. A strange alchymy of nature this, to ripen her products first in the colder sites, but perhaps necessary to the existence of plants in these elevated spots, where but for this provision, the early winter would prevent their ever coming to maturity. "Il est demontrè (says the brilliant Frenchman,) que les choses ne peuvent être autrement: car, tout étant fait pour une fin, tout est nécessairement pour la meilleure fin. Remarquez bien que les nez ont été faits pour porter des lunettes, aussi avons nous des lunettes. Les jambes sont visiblement instituées pour être chaussées, et nous avous des chausses. Les pierres ont été formées pour être taillées, et pour en faire des châteaux, aussi monseigneur a un très-beau château; et les cochons étant faits pour être mangés, nous mangeons du porc toute l'année."

The Dolomiœa macrocephala is a very common plant in all the upper Himalaya: Royle's plate, perhaps for want of space, represents the leaves erect, which are naturally quite procumbent; the root is highly valued as incense, and as such, is presented to gods and rajas. The Picrorhiza kurrooa grows abundantly on dry rubble from Kala Koondar to a great height on each side of the Shatool Pass, but I did not notice it elsewhere; the root is excessively bitter, and is sold under the name of Kurrooa in the Simla Bazar; it is the Kutkee of Kemaon.

September 12th.—To Doodach, eight or nine miles, which our coolies performed in four and a half hours. The route is much better and more easy than yesterday's, gradually rising over slopes, for the most part gentle, and crossing many rivulets from the left, some of them chalybeate. The banks of these exhibit in some places great walls of gneiss rock. The forest is now entirely lost sight of, and fuel must be brought in from Kala Koondar. Doodach is an open and level spot, well adapted for an encampment; it must be fully 13,000 feet above the sea, and is probably identical with the Kuneejan, of Gerard. We had hard frost at night. The Undretee, a mere rivulet, rises in a bed of snow, a little higher up, and flows about 200 feet below us. Immediately above it, the opposite bank rises to a very great height, in a magnificent façade of bare gneiss cliffs, the ledges supporting deep beds of snow, and terminating to the north in a steep conical peak, called the Dhuneer ka Thood. From these crags several avalanches of rock fell down at night, with the noise of thunder. Between our camp and the base of the Pass (about a mile,) the rock is quartz, in immense *coulées* of shapeless masses, heaped together without order and very difficult to climb over. They have fallen from a huge and very curious rectangular mass, which forms the western side of the Pass. Several interesting plants abound here; the Saussurea or Aplotaxis gossypina, clothed in dense wool, raises its conical form every where on the rocky rubble to the top of the Pass, resembling a vegetable spectre. It is called Kusbul, Munna Kuswal, and Bhoot-pesh, and is offered to the gods, who have evinced their care and favour by clothing it so warmly, exactly as they have protected the yak and alpine goat with a thick *waistcoat* of *pushmeena*. Another Aplotaxis is defended by a different contrivance; the leaves are gradually converted into large yellowish transparent bracts, enclosing the colts-foot-like blossoms as

if in a head of cabbage. This plant is common amongst the large rocks from Doodach nearly to the summit of the Pass, and is also sacred. It is called "Birm (or Brem) Kounl (or Kouwul)," i. e. "Brahma's Lotus;" a similar species on the high mountains behind Cheenee, has a strong odour of musk.

Fraser found the "Birmah Counla" on the Bumsooroo Pass, between Sookhee and Jumnootree, and describes it thus—Stalk covered with large and long leaves, somewhat like those of a primrose, ending in a cup like that of a tulip, appearing merely the continuation of these leaves, closing and forming the petals of a very noble flower, in the centre of which the stamina and pistil are seen. Petals greenish towards the base, but the middle and higher parts are black and yellow, as is the centre of the cup, but more vivid. The latter part of the description appears derived from a Fritillaria, and very possibly from the same plant which, "Pilgrim" (pp. 66, 67) says is so beautiful at Kadarnath in April: and though growing on the hard ground and out of the melting snow, is called "Lotus." In Kemaon, the Iris nepalensis is known as the Neela Kumul, or blue Lotus; and is a favourite plant with fukeers, &c.

Amongst the other plants found at Doodach and on to-day's route were two species of Aconitum. One, which seems to be known as A. dissectum (Hamiltonii or Speciosum) abounds at this elevation, and has the leaves cut into five segments, with light blue blossoms. It is called here Doodhiya Moura, but in Kunawur, Tilia Kachung. The other species, Aconitum ferox, is called Moura-bikh, or simply "Mora" (from mri, to die,) and is reckoned extremely poisonous. It only occurred in one spot, a mile or two above Kala Koondar, growing in an extensive patch, the stems from four to six feet high, with long dense racemes of splendid deep blue flowers: the follicles three. The mountaineers were shocked when I told them that an equally deadly species was a favourite flower in our English cottage gardens, where they concluded it could only be planted in the view of occasionally getting rid of a superfluous boy or girl. The handsome Ligularia arnicoides (figured by Royle,) was in full bloom every where about and above Doodach, and in similar situations all over the Snowy and Changsheel ranges. On the south side of the Roopin Pass there is another species, with reniform leaves. By the rivulets on the route, and high upon the Pass, the Primula stuartii and P. purpurea are abundant, and now with ripe seed. They are both

called "Jy-be-Jy" or "Jyan," and are very ornamental in May, June, and July. With these occurs a very handsome species of Dracocephalum or Lamium, called Gurounta, with a strong camomile odour when bruised. On bare rocky ground from 12,800 feet upwards is found the Centaurea (Aplotaxis) taraxicifolia, the "Dhoopree," with heads of purple blossom and a delicious fragrance like that of the sweet colt's foot. The showy musk-scented Delphinium (brunonianum ?) grows near the foot of the Pass, and is called "Soopaloo," "Ruskur," "Ruskachung:" it is, I believe, the "Liokpo," of Upper Kunawur, and is a curious illustration of the association in these lofty regions of musk in the vegetable as well as the animal kingdom. The Hymenolæna Govaniana, and several similar Umbelliferæ, with bracts greatly developed and beautifully fringed with white, are common, some of them attaining the crest of the Pass; among those lower down is one with decompound leaves, of a strong aromatic parsley-like fragrance, here called Nesir, and mentioned by Fraser as occurring near Jumnootree, under the name of Mahee. All this lofty region (from 12,000 to 13,000 feet) abounds with the Kanda, a species of prickly Meconopsis, probably M. nepalensis, in form like Royle's M. aculeata (which in his plate seems too deeply coloured,) except that the flowers are of the most lovely azure. Amongst the Doodach rocks grows the Sedum himalensis, very like the Rhodiola rosea of England, and amongst the rocks and snow at the source of the Undretee I found the Saxifraga granulata of England, and a Ranunculus (choorensis ?) much like the R. glacialis of Switzerland. Such are a few of the plants which "blush unseen" on these desolate wilds; a more leisurely examination would easily double the number. Nature, where she cannot be useful, seems determined to be ornamental, and converts these tracts where grain will not ripen, into pastures and flower gardens, where thousands of butterflies and insects enjoy their brief existence. The utility of nature must not indeed be limited to man, for there is scarcely one of these plants, the seeds of which do not support myriads of insects as well as many birds; and the highly successful experiment at Muhasoo is a sufficient proof that many of the forest tracts at least, and perhaps even the pasture lands above them might, by a moderate expenditure of industry and enterprise, be rendered available for the production of excellent potatoes, and thus enable the Himalaya to support

double or treble its actual population. Judging by the produce of the flocks and herds which now partly graze on these pastures, the soil and grass must be faultless; every traveller is struck with the quality of the milk—as rich as cream—at Rol, Jangleeg, and Jaka, placed at the lower limit of the belt where cultivation now ceases.

September 13th.—From Doodach over the Shatool Pass to Ateeng Wodar, twelve to fourteen miles, in somewhat under seven hours. An experienced native of Rol had earnestly advised us not to attempt the Pass unless the day were fine, and we were so far fortunate as to have a cloudless morning, and reached the summit, perhaps four miles, in three hours, mounting at a very easy pace; the ascent, indeed, is less fatiguing than that of the Choor from Seran; and on its completion we experienced none of those feelings of headache, giddiness, distress in breathing, &c., described by many travellers, and very sensibly felt by myself on a former occasion on the Roopin Pass. The route lies up over the frozen snow bed of the Undretee, and then up one steep continuous tract of broken, angular, masses of gneiss rock, of which there is a steep escarpment to the right, capped by a thick bed of the purest snow. The *col*, or semicircular summit of the Pass, is in its whole extent furnished with numerous piles of stones called Shoogars or Thooas—the "Ebenezers" of grateful and successful passengers; in number and height far exceeding those on the Roopin and Boorun Ghatees; the pillars being apparently in a direct ratio to the piety and the fear of the passengers, and the difficulty and danger overcome. Our men had provided themselves with stores of flowers, chiefly the Kounl and Munnakuswal saussurea, and the musk larkspur, which they tied in long garlands, and with which they decorated, first the pillars, and then, on the Hindoo principle of "Purmeshwur-hai," ourselves. They clearly fancy their gods to be as fond of musk as they are. On so cold a site, a few faggots of wood would be a more rational offering; but as their evil genii and demons are lodged in eternal fire, it is quite logical to locate the gods in eternal cold and snow, and it is remarkable that he who was prophet at Medina, and impostor at Mecca, also patronized this notion, for he affirmed that, when touched by the hand of Allah, the sensation was that of intense cold. On our return by the Roopin Pass, the garland ceremony was dispensed with, each man merely tearing a small portion of his clothes, and suspending it on the pillars, a custom

universal in these mountains, where we observe a bush or tree on each more eminent pass, ornamented with votive rags of all colours, precisely similar to those about holy wells, &c., in Ireland. With respect to vegetation, the Primula purpurea and Sibbaldia purpurea grow very high upon the south side of the Pass; the two Saussureas, a large Sedum (probably S. asiaticum,) a Rumex, and a pretty pink Corydalis (either hamiltonii or meifolia) reach the crest; and *above* that of the Roopin, I found patches of Potentilla inglesii; so far are these elevated ridges from being entirely forsaken by Flora!

The right or eastern portal of the Shatool Pass is formed by the pinnacle of rock, 1,500 feet high, and 17,000 above the sea, visible from Doodach; it is called Dhuneer ka Thooa (the Dunerko of Gerard,) from the Mookheea of Rol, who bribed a bold adventurer with a hundred rupees to scale it, and erect a pile of stones in honour of the Deotahs and himself. Moore tells us, that the schoolmen used to debate how many angels could dance on the point of a needle without jostling each other; and some of these Himalayan needles are so sharp, that the same question naturally suggests itself with respect to the thirty million of gods which the Hindoo Mythology has peopled them with. The Dhuneer ka Thooa sends down to the north a broken serrated spur, which falls to the west in a lofty and most superb escarpment of naked rock, which lay on our right as we descended. Looking down to the north, through the long vista of the glen, we had a glorious though somewhat limited view of the lofty peaks of the snowy range beyond the Sutluj, separating the Busehur district of Wangpo, north of the Wangtoo bridge, from the districts of Manes and Dunkur, in Speetee, and crossed by the Taree Pass, 16,400 feet above the sea. In some of our maps this range, or its outliers behind Kanum and Cheenee, is called the Damak Shoo, probably from the prevalence of the *Damak*, or various species of Astragalus, Caragana, &c. which grow there, and which our travellers in Upper Kunawur call Furze.

The Shatool Pass is 15,550 feet above the sea level, nearly 100 feet below the top of Mont Blanc: and was first crossed in June 1816 by General Hodgson. It is distinctly visible about E. 24° north from the top of Jaka at Simla, a degree or two to the left of Colonel Chadwick's house on the Muhasoo ridge, lying between two of those conspicuous inclined peaks of which the rocky planes slope down to the east and

ESE. at angles of from 10° to 20°, considerably to the right of the three-grouped and similarly inclined peaks, often but erroneously pointed out as the Boorun Pass. It is owing to this conformation of the strata that the routes up the vallies near this portion of the Snowy range invariably keep to their western and SW. sides; on the opposite ones, the strata "crop out" in inaccessible crags.

Beautiful are the "balancings of the clouds" at this and the past season in the Himalaya, and the endless variety of light and shade, which they cause on mountain, forest, field, rock, and meadow. No sooner has a shower fallen, and the sun shone out, than the process of evaporation commences in the heated vallies; the rising vapours are condensed at a given elevation into clouds, which, with a snail-like movement, creep up the mountain sides, and invest the summit or languidly tumble over the ridge into the next valley; "even in their very motion there is rest." Occasionally an entire valley or large tract of the mountain is covered with one fleecy mass, on which the spectator looks down as on a sea, a lofty peak here and there jutting up like an island. It must be confessed, however, that they are best at a distance and in poetry. Disagreeable at Simla, they are dangerous on the Shatool, where we had not been above half an hour, on the narrow crest, when from the south, clouds

> "Rose curling fast beneath us, white and sulphury,
> Like foam from the roused ocean of deep hell,
> Whose every wave breaks on a living shore,
> Heaped with the damned like pebbles!!!"

The wind also being very keen, and our only seat the snow, we effected a speedy retreat down the great northern snow-bed, of which we only reached the termination in an hour and three-quarters. The upper portion had been covered to the depth of two or three inches by a recent fall. To this succeeded a wearisome and, in many places, very steep and difficult *moraine* composed of enormous sharp, shapeless, fragments of gneiss piled on each other in wild confusion, the lowest ones resting on frozen snow. These would indeed prove "destruction's splinters" to the unfortunate, overtaken here by a snow storm, which would paralyse his hands and feet, and blind his eyes—all most essential accessories now; and accordingly this was the scene where Dr. Gerard in September 1820, had two of his people frozen to death at midday, and escaped

himself with great difficulty and the loss of all his baggage. In no month is the passage perfectly secure. It is effected with least difficulty early in spring, as the snow then covers all the rocks which so much impede one's progress; but I am not aware that the natives ever attempt the Shatool till the rains have set in; and even on the other Passes clear and perfectly *calm* weather is indispensable to safety.

The scenery on the northern declivity is wild and savage indeed: to the right are the magnificent black cliffs before mentioned, which, from the summit, slope back gently in great fields of snow, of the most dazzling whiteness; deep beds also lie at their base. To the left the mountains are more bluff and rounded but still greatly shivered. The Moraine ends to the north in a steep escarpment, and latterly our route over it, lay on the ridge of a very curious *bund* of snow, rubble, and rocks, about sixty feet high, and very steep on both sides, and apparently artificial as any railway embankment. Except that frozen snow is substituted for ice, the whole scene greatly resembles the Mer de Glace, and other glaciers of Savoy and Switzerland. A turbid stream issues from the base of the great snow-bed, and is joined by several torrents from the left; the combined stream a little below flows placidly for a while over a nearly level dale. During the day time the powerful rays of the sun melt the whole surface of the snow beds, and these torrents become unfordable: but at night, when all is re-frozen, they are dwindled to mere rivulets, only supplied from the bottom of the snow-beds being melted by the heat of the earth, and hence they are easily crossed in the morning. Below the moraine, the mountains rise steeply on each side, covered, especially on the left, with grass and herbage, now of a rich raw-sienna tint forming a strong contrast with the great beds of white-quartz masses, which on this side extend down to the valley, reflecting a most intolerable glare. The path, a very narrow and bad one, finally keeps close to the left bank of the stream, and so continues to Ateeng Wodar, a summer station for shepherds, equivalent to the *chalets* of the Alps, except that the Himalayan mountaineer is generally content with the shelter of a cave in the rocks, sometimes a little improved by a rude wall in front. Ateeng is nearly in the latitude of Rampoor, a short distance above the birch forest, about 12,000 feet above the sea, and perhaps nine miles from the crest of the Pass. The valley is narrow, and destitute of the savage features it possesses above,

but across the torrent to the east, the mountains are still very steep, bold and lofty, with many deep ravines filled with snow.

The vegetation consists here of Delphinium vestitum, Dolomiœa macrocephala, Cyananthus lobata, Onosma bracteata, aromatic rhododendron, and Cassiope fastigiata ("Talsiree") the "heather" of Fraser; with it grew a shrub with all the appearance of a Vaccinium, but with neither flowers nor *fraochans* to enable one to decide. Between Ateeng and the moraine, the Salix lindleyana creeps abundantly on the ground, and Royle's Arenaria festucoides is not uncommon; on the moraine itself was a plant very like his Saxifraga imbricata, abundance of Ranunculus choorensis, and one or two Gentians, in flower. These mountains no where exhibit the carpet of blue Gentians and Campanulas so lovely in the Alps. On the gravel beds and banks of the stream, the Epilobium speciosum, perhaps the finest species of the genus, grows in abundance.

The chief reasons for the Shatool Pass being so much dreaded are first—the intrinsic difficulty of the northern moraine, as well as the descent from Ateeng to Panwee, where the path is so narrow that even laden sheep pass with some risk: and secondly, the remoteness of supplies, fuel, and places of refuge. The Roopin and Boorun Ghatees have each a village within one stage of their southern base, and on the north, the valley of the Buspa is easily gained in one day by tolerable paths. Laden men cannot reach the Shatool from Rol in less than two days; and at Ateeng Woodar, on its north side, they are still distant a very hard day's journey, by an execrable path, from the valley of the Sutluj.

September 14th.—From Ateeng Wodar to Panwee, near the Sutluj above Wangtoo bridge, a distance which we estimated to be sixteen or seventeen miles, with a descent of 6,000 feet; a very fatiguing march, which we walked in eight hours, inclusive of several halts. In the contrary direction, it would indeed be a tremendous journey, and should be divided by all who travel for pleasure or profit. The route, by a bad pathway, gradually rises along the Alpine pastures, occasionally traversing a dense coppice of Rhododendron campanulatum, R. anthopogon (or lepidotum, the aromatic species) and mountain ash (Pyrus foliolosa or ursina,) the latter in full fruit, the berries occasionally of a beautiful waxy white, a variety probably of the usual red-fruited species,

which I have also received from the Harung Pass above Sungla. It forms a favourite food of the bears which are numerous hereabouts. Mingled with and below the Rhododendron and mountain ash to the right, are extensive shaggy woods of large white-barked birch (Betula Bhojpatra,) recalling many a romantic spot in the Trosachs, Glengariff, and Capel Carrig. The bark consists of as many as twenty layers, and is much employed in Kunawur in the flat roofs of the houses, where it is laid under a stratum of clay. Supposing the Himalaya to have emerged gradually from the ocean, this "tree of knowledge" may be held the last best gift of heaven to man in the vegetable way, for it could not exist till the mountain had attained an elevation of 9,000 or 10,000 feet; the silver fir, (Picea webbiana) must be nearly of the same age, and thus we may form a comparative chronology of the dates at which the various trees were successively produced. Quitting the birch braes, we encountered a steep ascent under fine gneiss crags and pinnacles, with tremendous declivities on the right hand, which brought us to the crest of the Ootulmai Ghatee, (called Gongrunch or Shaling by Alex. Gerard,) where the path turns to the left, and leaves the Shatool glen. Hence to Panwee is one almost uninterrmitted and generally extremely steep descent for a few hundred feet, over loose rugged rocks, covered with the large and now scarlet leaves of Saxifraga ligulata, and then through a superb forest of Picea webbiana and Quercus semicarpifolia, both streaming with long white lichens, also birch, and a dense underwood of mountain ash, Rhododendron campanulatum, Rosa webbiana, Syringa emodi (Lilac,) black and red currants, yew, &c. At the bottom of this glen, perhaps a mile down, we reached a small romantic dell, through which flows the Skooling or Shaling stream, and here the scenery is of a Titanic grandeur and wildness. On all sides, feathered with the dark silver fir, vast precipices spring up perpendicularly, and seem utterly to preclude further progress; it seems as if one had reached the gates of Hades. On the brink of the stream the Greek Valerian (Polemonium cæruleum,) and the lovely azure blue hound's tongue (Cynoglossum uncinatum,) were flowering in abundance. God might have made a more beautiful flower than this last, but he never *did*, as some one has justly observed of the strawberry as a fruit. Exit from this spot seems as impracticable as from the happy valley of Rasselas, and is only obtained by a short

sharp clamber, which introduces the wayfarer to the Panwee Dhunka, a distance of three miles, the most dangerous I ever traversed; the path so called, being excessively narrow, and carried along vast ledges of rock, inclined at a high angle to a bottomless pit on the right, from which they rise at an equally steep angle on the opposite side. I cannot recollect such enormous shelves of rock elsewhere, nor, except the Via Mala on the Splügen road, and the gorge of Gondo on the Simplon Pass, an abyss more profound. Neither of these, however, can compare with the Panwee ka Dhunka in the extent and luxuriance of forest, which here clothes the mountains above and below, to the right and to the left. The Skooling falls in a fine cascade down to the right at such a depth, that one can scarce bear to glance at it, save from such "coigne of vantage" as a tree growing from the cliffs. "The least obliquity is fatal here," and no one should attempt the passage who is not well assured of his nerves, or weary of his life. Bossuet has a passage so eloquent, and so apt to such a situation, that my readers, if any, will be pleased at its insertion here.

"La vie humaine est semblable à un chemin dont l'issue est un précipice affreux. On nous en avertit dès le premier pas: mais la loi est portée, il faut avancer toujours. Je voudrais retourner en arrière: Marche! marche! un poids invincible, une force irrésistible nous entraînent; il faut sans cesse avancer vers le précipice. Mille traverses, mille peines nous fatiguent et nous inquietent dans la route. Encore si je pouvais évitez ce précipice affreux! Non, non; íl faut marcher, il faut courir; telle est la rapidité des années. On se console pourtant, parce que de temps en temps on rencontre des objets qui nous divertîssent, des eaux courantes, des fleurs qui passent! On voudraît s'arrêter: Marche! marche! Et cependant on voit tomber derrière soi tout ce qu'on avait passé: fracas effroyable! inévitable ruine! On se console, parce qu'on emporte quelques fleurs cueillies en passant, qu'on voit se faner entre ses mains du matin au soir, et quelques fruits, qu'on perd en les goûtant: enchantement! illusion! Toujours entraîné, tu approches du gouffre affreux: déjà tout commence á s'effacer, les jardins moins fleuris, les fleurs moins brillantes, leurs couleurs moins vives, les prairies moins riantes, les eaux moins claires; tout se ternit, tout s'efface. L'ombre de la mort se présente; on commence á sentir l'approache du gouffre fatal. Mais il faut aller sur le bord. Encore un pas: déjà

l'horreur trouble les sens, la tête tourne, les yeux s'egarent. Il faut marcher : on voudrait retourner en arrière ; plus de moyens : tout est tombé, tout est évanoui, tout est échappé!" and it was our fate to escape these very literal precipices by an abrupt descent to Panwee, all through a dense and lofty forest, excepting the last 500 feet, which lead to the village through terraced cultivation. The forest trees occur in the following descending order—Picea webbiana, first alone, and then mixed with P. pindrow and Quercus semicarpifolia ; then Abies smithiana and Pinus excelsa, many of the latter fully 150 feet high. Lastly, the cedar feathers all the bold crags about the village, which across the Skooling torrent to the east rise precipitously into a lofty peak, arguing no easy marches ahead.

We encamped by a temple where our people found excellent shelter from the brisk showers which fell in the afternoon. A thick bush of sacred juniper grows in the enclosure, and the vicinity is well shaded by horse chestnut (Pavia indica), elm, peach, apricot, walnut, and mulberry trees. Panwee is a middling-sized village, above the left bank of the Skooling river, two or three miles from Wangtoo bridge, and from 1,300 to 1,500 feet above it. From several points above the village, the Sutluj, with the road to Chegaon, is visible ; as well as the wild glen of the Wungur, which joins at the bridge in one succession of cataracts. By visiting Panwee, we have enjoyed some of the sublimest scenery in the world, at the expense of a stage on our way to Sungla, for the direct route follows the Shatool stream to Melum, but our guides were, or pretended to be, unacquainted with it, and on enquiry here, we found that it is really impracticable to men with loads ; and have every reason to believe it must be extremely difficult without that encumbrance.

September 15th.—To Melum or Ramné (the Melung of the map), about ten miles in seven hours, by a difficult route, the path being for the most part as rocky, and in some places as dangerous as any we have traversed. At one almost impassable ledge, one of our dogs fell and had a narrow escape. (By the bye, dogs should not be brought into these parts—being perpetually in the way, to the risk of their own and their master's necks.) In several places jutting crags are only passed by the aid of the ladders, scaffoldings, and steps, so familiar to the traveller in Kunawur. On leaving Panwee, there is a steep declivity to

the torrent, which here forms a pretty cascade, as does that under Melum, about a mile short of the village. The vegetation here consists of rank grass, reeds, &c. Hence there is a considerable ascent to a point affording an interesting view of the Sutluj, and its picturesque rocky gorge where spanned by the Wangtoo bridge. Our path then led us down to the left bank of that river, now rolling along an impetuous torrent of milky water. A long ascent succeeds, with the river from 300 to 1,500 feet right below; and above us to the right hand long craggy façades, bristling with cedar which abounds hereabout. The road to Cheenee lies down on the opposite bank of the river. From the brow of the last ascent our path turned to the right up the glen of Melum, and met the Shatool Pass torrent in about two miles, where it has deposited an immense accumulation of drift timber, the spoils of the forests above. The trees on its banks here are chiefly Alnus obtusifolia, Rhus buckiamela, and Spiræa lindleyana. A gentle ascent of about a mile and a half brought us to Melum, also called Ramné, a small but well built village, about 7,000 feet above the sea, standing on a plateau, closely backed by steep woody mountains. By avoiding the last steep ascent to-day, and keeping direct on to the mouth of the Melum river, we might perhaps have reached Keelba; but the gentlemen and ladies who carried our baggage assured us, we should repent if we tried the very bad ascent from that stream.

September 16th.—To Keelba, about nine miles, which from the excessive ruggedness and difficulty of the worst path in the world, and its manifold steep dips and rises, we only accomplished in five and a half hours. First we descended to, and crossed a torrent below Melum, and then mounted by Yana or Janee village, till we came abreast of Chegaon or Toling, and on a level with it, 7,225 feet above the sea. It consists of a group of villages, with several large temples and extensive cultivation. On the crags at this point, I noticed the Incarvillea diffusa of Royle, an elegant plant which is also found on the Wangtoo rocks. Hence the path falls to the Sutluj, and leaving Poonung above to the right, continues along its brink for a few miles over boulders, gravel, and sand, overrun by a shrubby, silvery, and very aromatic Artemisia; the river is fringed by the "Wee," a species of olive, probably Olea ferruginea. The toom or ash, Fraxinus xanthoxylloides, is common, but of no great size. It is frequently met with in the higher parts of

Kunawur, and is known about Rampoor, as the Gaha or Ungah. The very jaw-breaking specific name is very justly applied. The Daphne mucronata of Royle here becomes a common shrub, called jeekoo; and near Yana, I first met a species of Celtis, called koo, of which the drupe, now ripening, of the size of a small cherry, is sweet and edible. There are two species or varieties; one a large tree called Ro-koo, with black or dark purple fruit; the other, Cho-koo, smaller, has yellow or orange fruit. This, and not Elæagnus, as surmised by Royle, I take to be the "red and mawkishly sweet berry," produced on a shrub in Hungrung, as mentioned by Herbert (Asiatic Researches, XV. 392.): as his "yellow and acid berry about the size of a currant," is no doubt the fruit of the Soorch (Hippophæ salicifolia). The Koo is pretty common nearly up to Brooang, at Meeroo, &c. It has been mentioned to me by a friend as occurring under the name "Kaksi" near Jungee, where, however, a subsequent enquirer could hear nothing of it: in all likelihood because the first had been misinformed as to the name; "Kagshee" being the Cornus macrophylla, which has a *leaf* like the Celtis. Both the Celtis and the Zizyphus have been identified with the famous lotus of the Lotophagi; but assuredly one may devour any quantity of Koos or Bers, without risk of forgetting one's home and friends. A little below Panwee, and generally up the left banks of the Sutluj and Buspa to Brooang, at an average of 6,000 feet, there is abundance of a species of oak, which I have not met elsewhere, though it seems to be the Quercus cassura, of Don's Prodromus. The leaves are exceedingly waved and spinous, tomentose below (as are the cups of the acorns, which are produced by six to eight) or solitary, on spikes or peduncles of five or six inches. They are now nearly ripe. The tree is called "Bré," but this seems to denote the genus only. Pinus gerardiana is pretty common, but not very large on the crags, during this day's journey:—and in the coppice, Abelia triflora occurs abundantly, here called "Spung:" the "Takla" of Bulsun and Bhujee.

From the river-bank, the path now ascends for two miles or so, to a few hundred feet above its level: another rainy season will, to all appearance, render it impassable, and it is now as dangerous as can well be imagined, crossing a vast landslip with a most precarious footing on loose sand and rocks, highly inclined, where each step receives and requires more deliberation than an act of Parliament.

What has been done once may be done again, but no reasonable man would attempt this a second time. The reward consists in the view of the river, here not above ten yards over, "a hell of waters" rushing on, like Pyriphlegethon, in perfect cataract, boiling, foaming, and tossed up vertically in one continuous mass of spray in its ungovernable career, amidst immense boulders, and under the tremendous precipices of the right bank, which it seems bent on undermining. What an antithesis between its recent quiescent state and gentle fall as ice and snow, and this unruly turbulence, and then its almost stagnant course onward to the ocean, where it enters on its final probation as vapor, realizing the hell imagined by Shakespeare :—

> "To reside
> In thrilling regions of thick-ribbed ice;
> To be imprisoned in the viewless winds,
> And blown with restless violence about
> The pendent world."

Above this, the river receives an affluent from Meeroo, and on an isolated rock, just above the junction, stands the Raja's Castle of Choling, the Chalgee of the map : still higher up, the Channel widens, and the river flows with a strong uniform current, bounded by a broad bed of shingle on its right bank. The Sutluj may here be said to effect its passage through the great range, and, generally, the traveller cannot fail to be surprised at the manner, almost resembling instinct, in which the river finds its way through such a labyrinth of mountains. It has here indeed followed the natural line of a vast echellon formed by the Shatool ranges to the south, and those of Speetee and Koolloo to the north : and from the Thibet frontier at Shipkee to Rampoor has an average fall of sixty feet per mile. The absence of lakes, and the existence of so general and efficient a system of natural drainage seems to argue the vast antiquity of the Himalaya, and may also serve to establish Lyell's theory of a gradual upheavement of mountain chains, which afforded time for the water to adjust their levels ; and to fill up the basins with those deep deposits of gravel and boulders, through which they are so often found to excavate their beds. The planes are indeed still far from uniformity ; and the roar of the torrent and the cascade, the sound of many waters, is rarely out of our ears as we approach the higher mountains.

From the rapids of the Sutluj an abrupt ascent of several hundred feet leads to the cultivation, chiefly buck wheat, and finally under vineyards, to the romantic village of Keelba, situated immediately above the river, surrounded by great numbers of fine peach, apricot, walnut and elm trees; while some superb weeping willows flourish by the beautifully clear rivulets which gush down on every hand from the lofty mountains to the south. These are densely wooded, and shew a front of splendid precipices to the north or north-west, ending in a high bluff of rock, which seems the "Yana Bul" of the map. Seen from near Meeroo across the river, the appearance is as if a great tract of ground had here subsided, having a high wall of rock on one side, reaching up to the Snowy range near the Boorun Ghatee. Meeroo itself is hidden from Keelba, but the neighbouring village and cultivated slopes of Oorinnee, 400 to 500 feet above us, are visible to the north-west; and to the east, the snowy peaks of the Ruldung just come into view. The grapes here and at Brooang, &c. have totally failed this year, probably from the prevalence of unseasonable rain, which fell in drizzling showers to-day and yesterday, but cleared up this afternoon. At Melum, a good room was placed at our disposal, with a second for our people: and we have the same advantage at Keelba.

September 17th.—To Brooung, Booroo, or Brood, eight or nine miles. We marched at 20 minutes to 8 A. M. and descended to the Sutluj, which here flows in a broad and comparatively calm stream: the path generally bad, lying up and down the crags, which are finally wooded with ash, olive, and neoza pine (P. gerardiana.) At half past nine we reached the confluence of the Buspa, which flows into the Sutluj like a mill-race, and is equally muddy, marking its source in a granitic tract. "Pilgrim" attributes the turbid waters of the Neelung to its source amongst mountains of slate clay (p. 33.) but on inspection of the Ruldung cluster, which may be called the cradle of the Buspa, with its great scars and flaws of whitish granite, induces me to conclude that the discoloration is due to the decomposition of this rock: it is exactly the same with the Arveron at Chamouni. The bluff crags and cliffs, feathered with cedar, and the twisted neoza, are very grand where the rivers unite: the Sutluj comes down through a narrow rocky gorge, a little above the point of confluence; a good Sanga, 5,968 feet above the

sea, is thrown across the Buspa, for the Pooaree and Cheena road; but our route lay up the rough, stony path on the left bank—the river a perfect torrent, in a very deep confined gully, where the channel is choked by huge boulders. At the fifth or sixth mile, we should have quitted the gorge, and ascended to Brooung: but we had loitered behind the coolies, and proceeding to the Brooung stream, were in full route to Sungla, when we fortunately met its Mookheea on his way to Ralec, who shewed us our mistake, and directed us back up a steep ascent of about 800 feet, where we lost our way again in a wilderness of fruit trees, and got at least 500 feet above the village, which, after two hours' wandering in complete uncertainty, we at length hit on quite accidentally. It is a poor scattered place, just above the left bank of the stream from the Boorun Ghatee, the snows and peaks of which are seen above: the inhabitants are a meagre, sickly race. It seems to be the place called Soorung, in the trigonometrical map—one of its manifold errors in typography. The elevation is generally given 7,411 feet, but in a German map, published at Berlin, it is stated to be 8,820 feet, (Paris) or 9,400 English, which is certainly too much.

On rivulets flowing into the Buspa, I noticed to-day a species of Tussilago (colts-foot) with the habit of T. petasites; it is said in May and June to produce fragrant yellowish flowers. With it grew the Polygonum runcinatum of Don's Prodromus.

September 18*th*.—From Brooung to Sungla, about twelve miles, in seven hours. For half this distance the path rises and falls along the left bank of the Buspa through beautiful scenery, the precipitous rocks feathered with the neoza pine, here generally called Shungtee and Ree. The course by the river then becomes impracticable; and a steep ascent of 2,000 feet succeeds nearly up to Chansoo, with a line of stupendous precipices to the right, the pents and ledges of which are clothed with splendid cedar and kail (Pinus excelsa,) many of the latter not under 150 feet in height. To the left, the Buspa rages in a series of cataracts through a tremendous abyss, which succeeds its comparatively level course over the Sungla valley. Boisterous indeed is the career of this aquatic Richard: its average fall being 250 feet per mile. The brink and face of the steep on this side is fringed with many superb old tabular-headed cedars, their gigantic boughs thrown about in wild disorder, like Lear, with outstretched arms, appealing in vain to the unpitying heavens.

The tree constantly prefers the steepest acclivities, a peculiarity which must be respected by those now trying to naturalize it at home: it will infallibly perish if planted in any ground approaching a swamp, a condition unknown to the Himalaya. Near the foot of this ascent there is a *dogra* or hamlet, belonging to Chansoo, with orchards of apricot, walnut, and peach trees, of which last the very abundant fruit was sweet and juicy. The people and the bears divide the prize; the former securing their share by day, which is dried in the sun for winter consumption. The bears, who are said to be very numerous, devour their portion by night. Chansoo is 9,174 feet above the sea, and is a most lovely and picturesque spot; the continuation of the cliffs before mentioned, extending behind it in a lofty amphitheatre, the brow of which is clothed with birch, now falling into the sere and yellow leaf of winter. The fields of Chansoo are shaded by very large walnut and cedar trees: we measured an elm twenty-nine feet round, at five from the ground. From Chansoo there is a route via Soang or Sheong, (9,000 feet), over the Sheoo Ghatee, (13,350 feet), to Paneemor and the Boorun Ghatee. It is very interesting from its carrying the traveller amongst the most splendid cliff-scenery: and from the summit of the Sheoo Ghatee several shadowy ranges, covered with snow, are seen to occupy the horizon from north to north-east—the far away mountains of Ladakh and Thibet.

Our descent towards Sungla was amongst huge detached masses of gneiss, and at about one-third the height ascended, we again reached the Buspa, no longer roving like a maniac in a strait waistcoat, but flowing rapidly, and frequently in three or four streams, along the open valley of Sungla: Kumroo, the old capital of Busehur, is seen across the river, and elevated several hundred feet above it: it is about a mile from Sungla; the intervening tract being a high plateau, a forest of fruit trees. The rajas found themselves Tartar up here, and determining to become Hindoo, removed to Rampoor, as—*parvis componere magnis*—Peter the Great left Asia and Moscow for Europe and Petersburg. The banks of the Buspa are here fringed with the willow and "Soorch," (Hippophæ salicifolia); and in three or four miles from Chansoo, we crossed to the right bank by a good Sanga, immediately under the village of Sungla, close to which we encamped, by a temple adorned as usual in these parts, with many heads and horns of wild sheep, deer, &c. Some of them belonging to an animal called kin, skin, or sikeeng, are of

monstrous dimensions. The very general practice of decorating the temples (not of the men but) of the gods, with horns, which prevails even amongst the Mohammedans of the Hindoo Koosh, reminds us of the expression—"horns of the altar"—among the Jews, as well as of the altar of Apollo at Delos, which is reported to have been wholly formed of them. There is perhaps a reference to the rays of the sun, which are denoted in Hebrew by the word Kiran, which also expresses horns; hence, when it is said "Moses' face shone," the Vulgate chooses to render it—"was horned;" and the Italian painters have ever since represented the prophet with horns just as Alexander the Great ("Dhul," Karnein) wears them in right of his father Jupiter Ammon. The sun would naturally play a prominent *rôle* in the primeval worship of the Himalaya, and I remember once at Paikha, on the upper Pabur, when marking out a short vocabulary, having "Purmeshwur" given me as the name for the sun: a significant commentary on the Gayatri!

Sungla is rather a large village, built on a slope facing the south-east, about 150 feet above the Buspa, and 8,600 above the sea. There seems no medium in the looks of the inhabitants, who are either very handsome or very ugly. Of the extreme beauty of the valley there can be but one opinion: the river flows swiftly down the centre over gravel and stones; above this, on plateau of various levels, is an abundant terraced cultivation of cheena, bathoo, tobacco, kodah, and the beautiful buckwheat, diversified by occasional woods of cedar, poplar, and the usual fruit trees, irrigated *ad libitum* without labour; the difficulty in the hills being to level the ground, and in the plains to water it. To the south the base of the outer Himalaya is sloping and verdant, with woods of cedar and koil firs: and immediately above the valley to the north-east, rise the enormous bare, grey, rocky scarps and pinnacles of the Ruldung group, with considerable snow beds wherever the slope allows, and still resisting the force of the southern sun. This magnificent group extends far up the Buspa towards and beyond Rukchum, above which a single pyramid of rock springs up nearly to the height of the loftiest peaks behind Sungla, 21,500 feet: but to see the valley and its setting in all its perfection of pinnacle, crag, and fields of the purest snow, one must mount to the highest hamlet towards the Roopin Pass. The scene strongly recalled Chamouni to my mind: the Buspa enacts the Arve well, and in each situation the mountains actually rise

about 13,000 feet right above the spectator. Seen laterally from Cheenee at only seven miles distance, the Ruldung presents the additional feature of dark and extensive forests, and the sharp needles are there mingled with long dome-shaped ridges, all invested in perpetual snow, from which, in June and July, is heard the frequent crash of the avalanche. "Ruldung" is the Kunawuree name for Muhadeo, who resides here, as Jove

> 'On the snowy top
> Of cold Olympus ruled the middle air,
> His highest heaven.'

The legend is, that Ruldung is a chip of the true Rylas near Mansorowur, brought here at the desire of an ancient king and penitent: and it is considered meritorious to perambulate the mountain, keeping it always to the right hand, exactly as the cairns, &c., are circled in Scotland and Ireland, and for the same reason, i. e. because the sun goes round the earth in this direction.* Amidst all this superstition, the sublimity and immaculate purity of the Ch'hota Kylas render it no mean emblem of "the high and holy one that inhabiteth eternity;" and we may quote with admiration, if we do not adopt with conviction, the lines of the poet, written under the inspiration of similar scenery—

> 'Mighty Mont Blanc! thou wert to me
> That moment with thy brow in heaven,
> As sure a sign of Deity
> As ere to mortal gaze was given, &c.'

There does, indeed, appear to be both benevolence and design in the existence of these great mountain chains, and we may consider the Himalaya as nature's vast reservoir for the irrigation of empires; opened every spring by Phœbus Apollo, when like Amram's son, he ascends from the south and causes the waters to gush from the flinty rock. It is probable, that a portion of the Hindoo veneration for the range is owing to its containing the springs of so many of the rivers which fertilize their country.

When at Sungla, the traveller should not fail to ascend the Harung Ghatee, over a brown sterile spur of the Ruldung, on the route to Me-

* I have seen a Sikh soldier go through exactly the same ceremony at a shrine near Makhowal Anundpoor. From how much superstition would a knowledge of the solar system have rescued the world!

bur and Cheenee, for the view of the snowy range and Passes to the south. The scenery on the Buspa at Rukchum is said to be of the finest description: want of time prevented our seeing them. At Sungla is first met the petit shrine called *Chastun* by the Buddhists; in one of the four sides a small cylinder revolves on an axis, which the passenger puts in motion. Such a cylinder on a great scale may be seen in the temple at Soongnum, inscribed all over with 'om mane pudme hom,' which Klaproth interprets 'oh! the Jewel is in the lotus:" of which the esoterie meaning is very deep. The prayer is considered as good as said by each revolution; an idea which could never have originated but in the mechanical and material mind of the Mongolian race.

This day, the 18th, was cloudy, and snow fell on the Passes to the southward, but the afternoon was fine. We halted on the 19th.

September 20th.—From Sungla to Nooroo Bassa, about ten miles, in six hours, generally up an easy ascent by a path which is perfection, compared with any between this and the Shatool: traversing first some woods of cedar and koil, and then over the cultivated slopes of one or two small hamlets, where the wheat and barley were being cut, and sent down to Sungla. Above this, the path lies over grassy mountains, with wooded crags across the torrent to the left-hand; the whole somewhat tame after what we have seen, but for the Ruldung. The Chough abounds amidst the cliffs in all this and the upper portion of Kunawur. On the way to-day, we met a herd of the Yak, which supplies the *Chownree*. In Thibet, or the neighbouring districts of Toorkistan, we have the origin of the Pashas of one, two, three, or many tails, who once carried terror over Europe. About 1,000 feet below Nooroo, the path turns to the right, the glen of the Nulgoon Pass being straight ahead. About here large beds of Ligularia arnicoides were in seed fully ripe, while on the south side of the range, it is still in full blossom: 700 feet higher, the declivities are covered with Anagyris barbata; the seed nearly ripe, but much injured by grubs. The roots are much branched, and extend several feet under ground. The plant is here called *Bhaloo ka buroot;* it flowers in May and June, and resembles a lupine of the deepest purple. Nooroo Bassa is an extensive open piece of grassy land, 12,985 feet above the sea, and a few hundred feet above the highest birches, which afford abundance of fuel. A stream flows about 100 feet below to the south amongst beds of

snow; its right bank is rugged and craggy; the left sloping and covered with Cyananthus, &c., the general prospect limited and rather uninteresting. A bitterly cold storm of sleet came down from the Pass, just as our tents arrived, and we had hard frost all night, fully a month before it is thought of at Simla.

September 21*st*.—Over the Roopin Pass to Rasur or Rasrung, called also Surra Peechoo, distance eleven or twelve miles. We left Nooroo at twenty minute past six A. M., and by an easy ascent reached the crest of the Pass at a quarter past nine, including, as elsewhere, several stoppages to collect seeds, &c. Heavy and suspicious masses of clouds accelerated our departure, but the sun soon dispelled them, and revealed the gigantic forms which surrounded us—the embodied frost—giants of the Edda, and very *unlike* the guardian angels seen by Gehazi to encompass the prophet. The northern declivity of the Pass is quite a trifle in comparison with that of the Shatool. On the 20th of September 1833, it was an unbroken and extensive sheet of snow, but to-day we only met two beds of it near the summit; nor is there any Moraine, so terrible at the Shatool from its chaos of sharp gneiss masses. Here the rock is chiefly flat micaceous slate, sometimes approaching to sandstone, and therefore of easy passage, though not macadamized. The grand cliffs of the Shatool are also wanting here, but on the left or east, there are some fine shivered pinnacles of rock, plentifully strewed with snow-beds and sufficiently high

> 'To shew,
> That earth may reach to heaven,
> Yet leave vain man below.'

And nowhere does he appear vainer and more insignificant than here, if we regard only his physical strength and size; at the same time, the mind of a Shakspeare or a Newton is more truly wonderful and sublime than all the Ossas heaped on all the Pelions in the world. The glory of the Roopin Pass consists in the cascades on its south side, in its lovely valley, and in the views of the Buspa Dell and the Ruldung pinnacles, which from this point are seen from NE. to E. rising from great fields of the purest snow, untrodden by man, and probably by any living thing. On the 21st September 1833, the thermometer boiled on the summit of the Roopin at 186°: the elevation is reckoned to be 15,460 feet: and on that day about noon it stood in the shade at 49°,

and in the sun at 68°. It is the Pass marked Goonas in the map, which is another error, the Goonas being more to the west. "Pilgrim" refuses to all this range the honour of being the veritable Himalaya, and Captain Herbert considered, that the true continuation of this latter was in the Ruldung group, penetrated by the Sutluj near Murung: it is however merely a question of more or less; and there is, at all events, no denying that from the Shatool Pass eastward, there is *a* snowy range, inasmuch as even on its south exposure, the snow never disappears; nor can the fact of its gradually declining below the zone of perpetual snow in the Moral ka Kanda, between the Sutluj and the Pabur, detract from its claim; though it must be allowed, that the mountains and Passes are inferior in altitude to those of Kemaon; nor can the north-western mountains, any more than the whole world, furnish the prospect of overwhelming sublimity which the spectator enjoys from the Gagur, Binsur, and many more points near Almorah. Still the easternmost Pass into Kemaon from Thibet, the Byans, is under 16,000 feet elevation, and of so gentle ascent, that it is crossed on horseback: and the Chinese invasion of Nepal proves that, still more to the east, the Passes can scarcely be so difficult as the Shatool.

Like Dean Swift, the mountains die at top first, and exeept a small white Helichrysum and the fragrant Centaurea, the vegetation on and near the Pass is now being rapidly burnt up by the frost: two or three Gentians, the Aconitum dissectum, and the Delphinium vestitum, seem alone to defy its power: but few flowers remain of Saxifraga parnassiæfolia (orglandulosa?), Sieversia elata, Ligularia arnicoides, the yellow Tanacetum, common Senecio, and a Polygonum like the bistort of the Alps. On the crest of the Pass grow the Aplotaxis gossypina, Potentilla inglesii, Hymenolæna govaniana, Corydalis meifolia, and Saxifraga imbricata; the last two in flower.

We quitted the crest at quarter past 10 A. M., the wind being bitterly cold, and descended 800 feet or so, over loose stones and frozen snow, by a steep rocky *kloof* to a kind of oval basin, extending in length from NNW. to SSE. from six to eight miles, by two or three across, enclosed by a barrier of black broken crags, debris, and snow beds; the surface covered with snow and mica slabs, thrown about in great confusion; a scene of utter silence and desolation. Here and there, there is a pool of water, and a multitude of tiny rills trickled under the stones, the

sources of the Roopin river, of which the glen below this valley, is found, after a long and steep descent, to be completely blocked across by a precipitous wall of black rock, from 250 to 300 feet high. Over this the accumulated streams leap down by two falls, which, to the best of my memory, surpass in beauty the finest in Switzerland: the water perfectly clear, and reduced to white mist like the Staubbach, falls in the softest wreaths over succesive tiers of ledges, and about a mile lower down, where the two falls are brought into one line, the effect is exceedingly fine. The path has hitherto kept on the right bank of the stream, but crosses between the falls, where in 1833, a deep snow-bed supplied a bridge; but this year, it is much melted here, though at the base of the lower fall, the river passes under an enormous mass of it. Here the path improves, following the narrow glen alongside the river, now flowing gently for a few miles as if to rest after its great leap. The mountain-cataract, which, having leaped from its more dazzling height,

> 'Even in the foaming strength of its abyss,
> (Which casts up misty columns that become
> Clouds raining from the re-ascended skies,)
> Lies low but mighty still.'

The lateral cliffs all down to Rasrung are continuous on each side of the valley, and so whitened with cascades, that the scene considerably resembles Lauterbrunnen, in the Canton Bern, and fully deserves that name—"nothing but springs." There is here indeed no wood, the whole being quite above the region of forest; but the grassy or rocky talus at the base of the crags, as well as the small levels by the water, are richly enamelled with flowers:—such as Primula stuartii, purpurea, and glabra: Sieversia elata, Aconitum dissectum, Ligularia arnicoides and another, Polemonium cæruleum, Scrophularia urticæfolia, the blue Meconopsis, and a host of Compositæ and Labiatæ, especially near the falls; the Greek valerian is very common, and in full bloom, as is a very pretty species of Forget-me-not; these, and the Lotus corniculatus are amongst the many examples which in these mountains frequently replace us for a moment or two in our native land:

> 'And, as in forts to which beleaguerers win
> Unhoped-for entrance through some friend within,
> One clear idea wakened in the breast,
> By Memory's magic, lets in all the rest.'

Many of our Himalayan tourists, especially the earlier ones, have allowed their imaginations to run away with their judgments, and have dressed up their descriptions more in the style of Macpherson or of Harris than of sober prose: but it must be admitted in extenuation, that the reality of the scenery, and the champagne atmosphere, able to drive all sadness but despair, have an inevitable tendency to exalt the spirit to the etherial regions, which there, Chamæleon-like, naturally assumes the tint of their deep native *blue*. Even in the physical department of the man, a greatly diminished dose of alcohol will suffice to produce intoxication. The daily repetition, however, of the sublime and beautiful, is very apt to create a revulsion of feeling, till at length, to get rid of the perilous stuff which preys upon the heart, we take refuge in apathy, and perhaps fall so low as to adopt the Frenchman's panegyric, "Grande, magnifique, superbe—pretty well!" or at least to swear with Akenside—

> 'Mind, mind alone, bear witness heaven and earth,
> The proper fountains in itself contains
> Of beauteous and sublime.'

After many delays from seed and plant-collecting, and a heavy storm of rain and hail at the falls, we reached Rasrung at half-past 3 P. M.; a small sloping plot, covered with grass and flowers, just below the highest birches on the right bank of the Roopin, which is here crossed by a natural bridge of snow, still from twenty to twenty-five feet thick. The usual encampment is a little lower down and on the opposite (or left) side of the river, under a high cliff called Jeyral, where water boils at 194°, which gives an elevation of 10,800 feet. Rasrung is about 11,000. The sward here, and at Seetee, is much cut up by an animal like "a rat without a tail," which is figured in Royle's Illustrations, and is also found on the choor. It takes two hours to reach the upper water-fall from Jeyral, and four, the crest of the Pass. We had frost all night at Rasrung.

September 22*nd*.—To Jaka, ten miles, in six and a quarter hours. A a cloudless morning, but we only reached our tents at 2 P. M. in time to escape a heavy rain, which fell in snow on the Passes. The climate up here is as "perfidious" as that of England: a sky without a speck at six A. M. is overcast by noon: at 2 or 3 P. M. we have a storm, and all is blue again: often however—and the phenomenon seems hitherto unex-

plained—no rain falls, but heavy clouds rest on all the mountains, which, notwithstanding the increase of cold, altogether disappear during the night. In Kemaon, when all else is perfectly serene, a fine thin wreath of cloud may be seen to issue from the summits of Nunda Devee (No. XIV. of the great map) and the Panch Choola (No. XIX.) which has led Europeans to the conclusion that a volcano exists there: while the natives solve the appearance by the supposition that culinary operations are going on amongst the immortals.

The route to-day was by a very rocky and often tree-encumbered path, but never difficult to a footman, following for some miles the right bank of the river, which is then crossed by a snow-bridge. It continues for a greater distance on the opposite bank, and finally returns to the right side by another snow bed, which must be permanent, being entered in the Trigonometrical Survey map, made about twenty-five years ago. For the first half or better, the glen, about 200 yards wide, is bounded on each side by noble-bastioned crags, in several places rising vertically from the river full 1,500 feet, and terminating in picturesque shattered pinnacles. The vegetation though luxuriant is still herbaceous, only consisting of Aplotaxis aurita, Polygonum molle, Aconitum heterophyllum, Cynoglossum uncinatum, Sedum purpureum, Spiræa kamtchatkica (Meadow-sweet), Polemonium cœruleum, Geranium wallichianum, Potentilla atrosanguinea, Corydalis govaniana, Scabiosa candolleana, Achillœa millefolia, a straggling Cerastium with flowers like Stellaria holosteum, called Gundeeal, and used as a vegetable. But the birch soon clothes the cliffs, and then fine clumps of the dark silver fir (Picea webbiana) like so many gigantic cypresses, appear and become the predominant tree, with maple, and a rich underwood of lilac or "Shapree" (Syringa Emodi), the lemon-scented Laurustinus, "Tealain" or "Thelain" (Viburnum nervosum of Royle), Rhododendron campanulatum, Lonicera obovata and bracteata, Rosa sericea, Ribes glaciale and acuminata, several Salices, &c. Amongst the shady rocks here and on the eastern side of the Changsheel, &c. grows a large tall composite plant of the Corymbiferæ, with a very strong smell of raw carrots; and on the cliffs of the right bank I found large tufts of a very elegant Dianthus, in full bloom, of a pink colour.

The levels on the river banks are delightfully wooded with birch, pine, maple, &c.: the scenery is so exquisitely beautiful, combined with

the grandeur of the rocks, that one is tempted to reverse the Persian proverb and ask what was the purpose of creating heaven while this valley existed? The Roopin, occasionally bridged and banked by snow-beds, and clear as crystal, dashes on from rock to rock, augmented every half mile by rivulets from the lateral cliffs and glens. These are generally constituted of mica-slate, but at the lowest snow-bed, the rock alters to quartzose strata, with a corresponding change in the scenery. Crossing to the right bank, the path ascends a steep of 800 to 1,000 feet, and the silver fir gives place to a dense and lofty forest of koil and pindrow pines, yew, hazel, Rosa webbiana, &c. The glen narrows to a gorge, the left bank presenting a wall of magnificent cliffs, perhaps 2,000 feet high, facing WSW., the brow splendidly wooded with pine. These cliffs soften down opposite Jaka into steep declivities, covered with forest and spacious grassy glades. The river raves below, and is no more approached in this stage. On leaving the forest, we reached Jaka by about a mile of more open country, interspersed with thickets of Rosa serieea, Berberis brachybotrys, &c. The pasture is covered with Iris kemaonensis, Inula royleana, the scarlet and orange varieties of Potentilla atrosanguinea, &c. Jaka is but a small village, overhanging some huge crags, and surrounded by great horse-chesnuts, walnuts, peaches, &c. under which we pitched, but found their shade much too chilly. Water boiled at 198, which gives under 8,000 feet: but the place is probably higher. We found the people very civil; a frank, rough, good-humoured set, the Mookheea especially, being a pattern of these excellent adjectives, and like Democritus, meeting every difficulty with a laugh or a loud whistle, the Lillibullero of the Himalaya. The people are of small stature and dark complexion, negroes almost compared with the fair faces of the vallies below Simla, which proves, if proof be wanted, that the colour is not entirely dependent on climate.

September 23*rd.*—To Kooar, nine miles, in four and a quarter hours, an easy stage in this direction. For about a mile and a half the path is execrably bad, rocky, and steep, descending about 1,500 feet to the river, and reaching its bed by a short but rather difficult ledge of rock, known as the Tunkoor Ghat, which reminded us in a small way of the Panwee ka Dhunka. The Roopin seems here to have several names, Sheelwanee, Gosung, Tous, &c. We soon quitted its bed, and re-ascend-

ed some 800 or 1,000 feet, through forests of pindrow, large hazel trees (Corylus lacera), Grewia (or Celtis), Rhus buckiamela, Millingtonia dillenifolia, Staphylea emodi *(nagdoun*, the snake-subduer), Symplocos paniculata, Betula cylindrostachya, elm, and maple; the vegetation of Nagkunda. The opposite bank is one series of huge crags and cliffs, falling sheer down to the river, with a "boundless contiguity" of pine above. A large tributary here joins the Roopin from the wild shattered glen of the Nulgoon Pass. Open, grassy, and rather warm mountains succeeded, on which the path gradually declines to the river, where we reached the left bank by the sanga—called in the map, Wodar—from an impending rock, used as a sheep-fold. From this an easy ascent of two miles, shaded by elm, Horn-beam (Carpinus viminea), horse-chesnut, Cornus macrophylla, rhus, Alder birch, maple, and Mohroo oak—brought us to Poojalee, a very well-built village, one of the group of four or five collectively, called Kooar, situated on the sunny slope of the mountains, amidst a profusion of the usual fruit trees, and with a spacious tract of terraced cultivation, now one rich glow of the splendid carmine, orange, and yellow hues of the Bathoo, and the more delicate pink of the Phuphur or Buck-wheat. A fine stream rattles past the village from the mountains above, which extend from NE. to SE. covered with forest, and reaching the region of birch. They slope up easily, but from N. to NE. several bold peaks and bluff rocky promontories stand out in all the "wild pomp of mountain majesty."

Though now uncommonly low, the Roopin is here quite unfordable; its general temperature from Rasrung down to Kooar, is in the day-time from 46° to 50° at this season; from the clearness of its water and the beauty of its banks is most likely derived its name, which I think signifies "beautiful," as "Pabur" means "clear"—Tous (or Tamasa) "dark blue," &c. All the advantages indeed, of this valley, Paradise are counterbalanced by some serious drawbacks, one of which, the goitre, deforms rather than afflicts almost every inhabitant of Kooar; for while it shortens the breath, it does not, they say, shorten life or cause pain. In so far as it disables its subject from climbing the mountains, nature may seem to fail in adapting man's organization to his circumstances: but I could not learn that with his breath she takes away his mind too, as in those shocking samples of humanity, the cretins of the Valais, &c.

Water boils here at 198, which would give about 8,000 feet elevation. The villagers are of dark complexion. They keep numerous bee-hives, as usual located in the walls of the houses, which are very substantial, of stone and timber, roofed with thick slabs of mica-slate,

September 24th.—To Kala Panee, ten miles or perhaps more, in five hours and fifty minutes, of which the minutes were spent at Doodoo. The path falls in about 600 feet to the Roopin, passes it by a sanga, and continues for about a mile on the right bank through grass; then crosses a torrent from the Changsheel Pass, and finally quits the Roopin river and glen by an ascent of 1,200 feet up the steep grassy mountain to Doodoo or Doodrah, a considerable village, reckoned 8,732 feet above the sea, and the chief place of the district called Ruwain in NW. Gurhwal; the locality of which, Prinsep in his account of the Ghoorka war declared himself unable to assign. The Iris nepalensis is plentiful here on the damp shady ground, as Iris decora is on the sunny meadows below. The Mohroo oak (Quercus dilatata) grows at Doodoo in great beauty and perfection: one specimen by the wayside measured nineteen feet round at five from the ground, and possesses so superb and verdant a head, that it would have been deified in the time of the Druids. It does not appear that any superstition attaches in these mountains to the oak similar to those which made the Greeks people it with dryads and oracular demons, and the Celts to regard it as the habitation of Darnaway, their Jupiter Tonans, as apostrophized in masonic strains by one Vettius Valens Antiochenus;

> 'By the bright circle of the golden sun,
> By the bright courses of the errant moon,
> By the dread potency of every star,
> In the mysterious Zodiac's burning girth—
> By each and all of these supernal signs,
> We do adjure thee, with this trusty blade,
> To guard yon central oak, whose holy stem
> Involves the spirit of high Taranis:—
> Be this thy charge.'

Our mountaineers are too much accustomed to lop oak branches and leaves for their cattle to believe there can be any thing very sacred about it.

At Doodoo, the path turns to the right, and after rising for a mile or more through an open cultivated country, enters the forest, in which it

continues generally ascending, for three miles more to Kala Panee, which is a very damp confined spot, so closely hemmed in by the trees as scarcely to afford space for a tent. This forest, covering the north side of a spur from the Changsheel, is very dense and chilly, consisting for the most part of tall pindrow firs, yew, maple, hazel, cherry (Cerasus cornuta), white-beam (Pyrus lanata), with a very rank undergrowth of Nepeta govaniana (a very aromatic plant), Adenostemma, and a tall shrubby species of Strobilanthes, which also abounds on Huttoo and Muhasoo, and which the hillmen fancifully assert to flower only on the year of the Muha-koomb at Hurdwar. The truth is, that the plant is greedily eaten by sheep, and that perhaps not one in a myriad escapes being browsed too low to admit its flowering, which this season occurred from August till October.

Water boils here at 197°, and the elevation is probably about 9,000 feet. There is no village nearer than Doodoo, from which supplies must be brought on. Heavy storms of rain, hail, and thunder all the afternoon from 2 P. M. made this uncomfortable spot doubly wretched.

September 25th.—Over the Changsheel Pass to Looloot or Lourrot, about eleven or twelve miles, which took us eight hours, including many stops and a long rest on the Pass: the march may be easily performed in six hours. The route continues up the forest, which abounds in streams; path rather rocky, and blocked up by fallen trees. The black bear is common and dangerous: we saw a man at Doodoo who had been terribly torn by one without any provocation; the white or yellow species is also said to abound, but frequents the crags on the heights above the forest. Emerging at length from its chilling shade, we reached an alpine glade, like all the higher parts of the Changsheel, a perfect carpet of flowers of all forms and colours; the Botanic Garden of Asia. Amongst them were conspicuous the Anagyris barbata, Morina longifolia, and Codonopsis rotundifolia; and now the Picea webbiana, Rosa webbiana, lilac, currant, &c., appear, followed, as we rose, by Dolomiæa macrocephala, Cassiope fastigiata, Ligularia arnicoides, sweet Centaurea, Polygonum vacciniifolium, tansy, and other plants of the snowy range. On the western side, the Caltha govaniana (or Himalensis), the marsh marigold of England, the azure Meconopsis, and a large Cynoglossum (grandiflorum) resembling the common English hounds-tongue, are abundant, as the Cyananthus lobata is on both sides. The crest

of the Pass, 12,871 feet above the sea line, is attained after a considerable ascent in the region above the forest, with lofty grey crags and spires of gneiss and mica slate above on the right hand; and is considered high enough to be worthy of the stone cairns which mark the fear and the gratitude of the mountaineer. Being fortunate in a cloudless day, we rested a considerable time on the summit to inoculate our minds with the most extensive and magnificent panorama around us. The snowy range, that embodied eternity, "shining like truth" or rather considerably more brilliant, is seen to perfection, and not looking the worse for a good sprinkling of snow yesterday; the Changsheel itself is perceived in this direction emanating from the parent mass in a ridge of shattered crags and pinnacles, on which summer may be fancied to have been just impaled by the frost-giants; and the range from the Boorun to the Shatool Pass, with its lofty, shelving, and now russet-tinged continuation towards Rampoor and Huttoo. It is interesting to observe how regularly the forest all round ceases at a regular level, or at best creeps beyond the line of demarcation a little in the ravines, to be succeeded by the zone of grass and flowers. Kooar is seen below to the east, and on the west the view reaches down the vale of the Pabur to Chergaon and Rooroo. To the SW. is a great reach of the Changsheel, the rounded and almost tabular summits rising considerably above the luxuriant forest which clothes their lower declivities, and presenting a gently sloping surface of the finest yellow autumnal tints; a most inviting though rather remote site for a settlement. The supply of wood for fuel and timber is inexhaustible; and the rice of Chooara would supply abundance of one important element of food:—at all events, it would furnish a most eligible spot for the head-quarters of a summer party from Simla. The circle of vision is completed on the south by a dreamy, mystic, "multitudinous sea," with the snowy range for the bounding surf, the swelling outlines melting into each other, and the whole seeming as if it reposed to all eternity after the enormous efforts by which it was upheaved. The Himalaya is seen to the best advantage, not at noon, but a little before sun-set, when, especially in the cold season, its whole extent is at once, and most gloriously lit up to a rose or copper colour, "one living sheet of burnished gold." Gradually the "sober livery of grey twilight" creeps up towards the loftiest peaks, extinguishes all their "bright lights" and replaces them with the deadly

pale hue of a corpse; the soul of the mountains has departed; and if the spectator be contemplating the ranges north of Simla, he says or sings its requiem with the pun—"Sic transit gloria *Mundi!*

The descent from the Changsheel Pass to Looloot is by the south side of a great spur of the mountain, and is so gradual and winding that the forest is not reached for above two miles; the first trees met are the birch, the horned cherry, the mountain ash, the Kurshoo oak, the silver fir, and most abundant coppice of Rhododendron campanulatum and Rosa webbiana. The oak and fir soon predominate; lower down the forest is almost exclusively pindrow, with koil, rai, cedar and the sweet Viburnum: and lastly, the usual thickets of Rosa sericea, Berberis, and Indigofera, lead to the arable tracts. Except in the pindrow forest, where it is steep and slippery, the path is generally very good this stage. Water boils here at 198°, indicating an elevation of from 8,000 to 8,500 feet: but the thermometer had not been verified, nor the water distilled, both very necessary to the accuracy of the process. Looloot is an insignificant place, and the inhabitants seem a poor, filthy and rather ill-looking race. They have had however, the spirit to introduce the cultivation of the potato, of which we obtained a small but welcome supply. This is the only site beyond Muhasoo where we observed any. A stream flows towards the Pabur below Looloot; the opposite side of the glen, to the SW., is thickly peopled, and beautifully cultivated, the Bathoo as usual in the greatest proportion. With all its brilliancy, the bread made from its flour seems bitter and unwholesome.

September 26th.—To Chergaon, eight or nine miles, in three hours: the first part of the route is a descent of from 1,500 to 2,000 feet down grassy mountains to the Pabur, which we crossed by a sanga of two spars opposite Tikree. The path then keeps the right bank to Chergaon, and is good, except in one place where it passes for a few hundred yards on a narrow rocky ledge, about 200 feet above the river. Here, in 1833, a friend of mine lost his ghoont by the fall of a small bridge, and in general, it is not advisable to take ponies beyond Chergaon. In May and June, when the glen of the Pabur is excessively warm, the traveller to the Shatool and Boorun Passes may avoid it by keeping the heights above the right bank by a route from Huttoo, given by Captain Hutton, in one of the volumes of the Journal of the Asiatic Society of Bengal. Even at this season we found the temperature

disagreeably warm, till the sunny forenoon was succeeded by a cool cloudy day. On the 27th we walked to Rooroo Kothee in two and a half hours.

September 28th.—To Thana Kushain, ten and a half miles, in four hours and forty minutes: the road is good, chiefly through cultivation; quits the valley of the Pabur about three miles below Rooroo, and in two more, by an ascent of 1,000 feet, reaches Krassa, an exceedingly well-built and comfortable looking village; the Kunaits, or descendants of the Rajpoots and aborigines occupying one department, and the Kholees, or Helots, a separate one. These poor outcasts are held in great contempt, and are never allowed to mix in society with their liege lords, the Kunaits. In a pine-wood here, the downward traveller should breakfast and pass the heat of the day. Hence the road undulates up the left bank of the alder-fringed Pursrar or Dogra Nuddee, formed by two branches which unite below Kuskain. We ascended the fork for 600 or 800 feet, and encamped a little above the village in a very airy spot, shaded by some fine cedars, with the twin-village Thana a little below to the west. The elevation is probably 7,000 or 7,200 feet, which ensures a delicious climate after Rooroo. About 500 feet higher, and a mile distant on the ridge above to NW., is the small but rather inaccessible fort of Tikhur, formed by two square-roofed bastions, connected by curtains, all of good masonry, and held by a garrison of one man, who refused to surrender till my companion climbed over the wall and opened the gate. The walls command an interesting view of spacious and well-cultured mountain slopes, with several large villages, above which the koil pine abounds, crowned by the lofty Chumba ridge and Suraroo Pass. This is the Nawur District, rich in iron ore, which is found disseminated in grains like iron-filings in a grey, friable micaceous sandstone, which is quarried from mines a little below the village, pulverized, and then washed in running water, which carries off the earthy matter; the ore is then smelted, and as much as a thousand maunds are said to be made in favourable years: most of which is carried on mules to Simla and the plains. The shafts or mines dip at all angles, and are very like the dens of wild beasts; they are more or less inundated during the rains, and the work can consequently only be carried on during the cold and dry seasons. Some of the ore is sent to Shyl to be smelted, probably to economize wood. The usual

rock here is a silvery grey mica slate, containing a very large proportion of quartz. There is also a blue clayslate, with which the houses are roofed in the concave style.

September 29th.—To Shyl or Hurrela, ten miles, in six hours; we had considerable difficulty in getting coolees; Kushain brought up its quota punctually, but on applying to Thana, we found that the Mookheea, having forgotten or disregarded, if he had ever heard, the precept of the Temperance Societies—

> "There's not a joy this world can give like that it takes away,
> When the glow of slight excitement yields to drunkenness the sway,"

lay gloriously or hopelessly drunk—'o'er all the ills of life victorious;'—so that we were compelled to assume his official functions, and use a little gentle coercion. The route lies up the mountain a little to the left of Tikhur, and on reaching the crest of the Chumbee range, continues along it to the right, gradually ascending. The mountain, hitherto smooth and grassy, with a mica slate basis here changes to gneiss, which occurs in a labyrinth of great blocks and crags, with a coppice of Kurshoo oak, Viburnum nervosum, cotoneaster, &c. The more common plants are Nepeta govaniana, Impatiens (glandulosa?), Potentilla atrosanguinea, Polygonum molle, Delphinium vestitum, several umbelliferæ, and the Anemone discolor, "Kukra," which in May covers the mountains with its white and blue. The acrid leaves are used by the mountaineers to raise blisters; but they are said to produce bad sores, leaving a permanent scar. The "Chitra" or Drosera muscipula—"Sundew"—a curious little plant which abounds between Kotgurh and Simla is applied in the same way. The elevation of the Suraroo Pass is 9,875 feet, commanding a glorious and extensive view, which includes the Koopur and Kunchooa ranges, the Moral and Changsheel up to the snows, with a long segment of the great range itself, in which the positions of the Shatool and Boorun Passes are well fixed by their pyramids. On the other side the huge wooded and grassy range of Huttoo is the most prominent object, its base watered by the Chugountee Nuddee, the opposite or western bank of which presents one of the most beautiful and extensive sheets of cultivation in these mountains. Chumba, Chumbee, or Chamee is a term very generally used in the Himalaya to express a mountain range. The road to the summit of this Chumbee is good, and we reached it in three hours very quiet walking; but the descent to Shyl is the

very reverse, the path being very steep, bad, and rocky, over a most dazzling decomposing micaceous shale near the top, and with some awkward steps near the bottom, where several streams are passed—the head waters of the Chugountec, one of the main feeders of the Girree. Shyl is a considerable village, or rather group of villages between two of these, and possesses a good share of arable land. It belongs to Busehur, and is about 8,000 feet above the sea. Passing the villages we descended by a rough flight of stone steps to a stream, and then re-ascended the opposite or Huttoo side, till about 100 feet above Shyl, where we pitched our tents by a Bowlee amidst woods of young cedar. Supplies are got with difficulty from Rutnaree, a village about one mile south, which shares alternately with Shyl, the charge of hospitality, and which would apparently transfer to it willingly the whole honor and merit of entertaining strangers, perhaps from having hitherto been so unlucky as to chance on few or no angels amongst them.

September 30th.—To Nagkunda, eight or nine miles, over Huttoo mountain, of which we reached the summit, 10,670 feet, (water boiling at 190°) in 1 h. 50 m. by the Pugdundee route, which keeps to the left of and below the made road, and, which from precipitous rocks, is impracticable for ponies. The made road passes under a ruined fort called Kurena, and then over the north shoulder of Huttoo, within 400 feet of the summit, on which we passed some hours. Huttoo or Whartoo, may be called the Righi of the Himalaya; but it must be confessed, that we are here totally deficient in three main constituents to the attractions of the Alps: first, their exquisite lakes; second, their equally exquisite hotels and markets; and third, their historical or legendary associations, such as those of William Tell, and the confederates of Grütli. In Hindooism the gods interpose so constantly, that man is nothing. But so far as natural scenery is concerned, I do not know a more delightful walk than that along the rounded swelling knolls of the Huttoo range, with its edging of "castled crags" of gneiss rock to the north-west, its alternate coppices of Kurshoo oak, and meadows enamelled with flowers, and its spacious views. Those of the snowy range are inferior to few, extending from (probably) the Peer Punjal of Kashmeer by the Chumba, Koolloo, and Shatool ranges, to and beyond Jumnootree, which rises over the high slopes of the Changsheel like a double-poled tent. Choor, Koopur, Kunchooa, Moral, are all conspicuous features; Huttoo itself being protract-

ed towards the last in the darkly wooded summit of Kot, below which to the right is Nowagurh, once a garrison of the Ghoorkas, who had also several posts, now dilapidated, on Huttoo, and who indeed, Kenite-like, made their nests on the rocks of every commanding height in these provinces. Half way between the Choor and Kunchooa range in Tiroch (the Ootroj of the map,) appears an isolated summit, probably Deobun, on the Mussooree road, between the Tons and the Jumna. On the W. and SW. are the Shallee and Muhasoo mountains, and on a clear day the houses of Simla may be discovered on the distant and hummock-like Jaka, which, after the grander features of the interior, looks small indeed. All around is the same ocean of summits and ranges which render the Himalaya rather one vast mountain of 1,500 or 2,000 miles in length, than a series of mountains; for no where do we find the comparatively broad vallies of other systems, and this character may be best expressed by a different reading of one of Campbell's lines, "its peaks are a thousand, their bases are one." In the absence of lakes it is apparently parallel to the Andes. Including the charming walk from the summit of Huttoo down to Kotgurh, and the ascent thence to Nagkunda, the botanist will enjoy a rich treat on Huttoo and its great buttresses. The summit pastures are alive with Fritillaria verticillata, Morina longifolia, Aster alpina, Anemone discolor, Corydalis govaniana, Potentilla atrosanguinea, Viola reniformis, Hemiphragma heterophylla, Veronica, &c. &c.; and the crags with Lloydia Himalensis, Saxifraga ligulata and parnassiæfolia, the shrubby Potentilla rigida or arbuscula, Anemone villosa (which is very common on the rocky banks of rivulets above the forest belt of the great range), two species of Lonicera, one of which greatly resembles L. alpigena, Ribes acuminata, Pyrus foliolosa and lanata, and a few very stunted specimens of Rhododendron lepidotum. The Roscoea alpina is found up to 9,500 feet. The declivities of the mountain are clothed by a magnificent forest of Abies smithiana, Picea pindrow, Quercus semicarpifolia, maple, yew, and towards Nagkunda, sweet scented Viburnum (Thelain), Kadsura grandiflora, Deutzia corymbosa, Philadelphus tomentosa, Symplocos paniculata (Lodh, Loj—a sheet of white bloom in May), the scanitent Hydrangea, (H. altissima), Rhus buckiamela, Jasminum revolutum, and many species of Desmodium, Indigofera, Berberis, Clematis, &c. form a dense brushwood or coppice; while the mossy rocks and shady banks are covered with Wulfenia am-

herstiana, Primula denticulata, Pedicularis megalantha, Gypsophila cerastioides, "Bhatlee," several beautiful species of Impatiens; and in the deepest recesses of the woods Actæa acuminata, Aconitum palmatum, Angelica glauca, Adenostemma, Strobilanthes, Lilium giganteum, called "Book," and Arum speciosum, "Gangsh or Jungoosh," a curious plant, the spathe of which beautifully striated with green, and ending in a long thread, bears an alarming resemblance to the hood of the cobra di capello. In autumn the bushes towards Kotgurh are matted with the leafless and sweet-scented Dodder (Cuscuta grandiflora), which, having no root, the natives may safely promise boundless wealth to the lucky man who finds it. The Akash-bel, or heavenly twiner of the plains, Cuscuta reflexa, may be considered the Mistletoe of the Brahmans.

Huttoo only requires a deep lake and a slide of Alpnach to be a mine of wealth in its timber; at present it lives, dies, and rots uselessly. In several places large tracts of pine have been killed, perhaps by lightning, and remind us of Milton:—

> "As when heaven's fire
> Hath scathed the forest oaks or mountain pines,
> With singed top, their stately growth, though bare,
> Stands on the blasted heath."

The Berbery at Nagkunda, &c. is a distinct species, which is now covered with the most profuse crop of fruit, of a fine blue, with a bloom of a pink or lilac colour. It makes excellent jam, and I have had the pleasure of seeing young plants raised in Dublin from seeds which had undergone that fiery ordeal unscathed.

The descent to Nagkunda occupied us one hour and twenty-five minutes; there is a good bungalow, and two or three buneeas. As is frequently the case in this direction, the waters flow on one side to the Bay of Bengal, and on the other to the Arabian sea. The elevation of the bungalow is 9,000 feet. In one of the shady glens to the north, and about 1,000 feet below, there is a most copious chalybeate spring, known as the Lal-panee.

The Polygonum molle or polystachyium is very luxuriant about Nagkunda.

October 1st.—From Nagkunda to Muteeana, by the Pugdundee route, over the back of the Kumuloree or Sheerkot mountain, about ten miles, which we walked in three and three-quarter hours. The path rises

through brushwood immediately behind the bungalow for about 4,000 feet, or 10,000 above the sea, and in about two miles enters the forest of pindrow, yew, maple, white-beam, Cerasus cornuta, Cotoneaster affinis (Rous) and acuminata, with occasional glades covered with the richest beds of flowers, Potentilla atrosanguinea, Anemone discolor, Geranium wallichianum, Aplotaxis aurita, Spiræa kamtchatkica, Campanula latifolia, Ranunculus, &c. In the forest we find Erysimum alliaria, Strobilanthes wallichii, Nepeta govaniana, Aconitum palmatum, Callimeris flexuosa, and a species of Diplopappus resembling it, Senecio canescens, and a very elegant species, perhaps asplenifolius, also common on the north side of Huttoo: on the rocks, Mulgedium macrorhiza, Saxifraga ligulata, mucronulata, and another: and under the shadiest crags, the may-apple of N. America, Podophyllum emodi, and the enchanter's night-shade, Circæa intermedia, whose only connection with the black art seems to be the fact of its loving the absence of the sun. The views of the Chumba and Koolloo snowy ranges are magnificent, seen over and through the primeval forest, with the great range of Mundee to the right or north, the base covered with villages and cultivation, and the crest reaching up to about 11,000 feet, reported to afford cedar of the first dimensions. Huttoo lies on the left hand, and, latterly, Shallee, Muhasoo, and Simla, in front. At an abrupt turn, a path strikes down to the right towards the Sutluj and Koolloo, which must be carefully avoided, as well as another a little further on to the left, which will equally, though not so fatally, mislead the wayfarer, and beguile him of his summum-bonum, which, under present circumstances, is probably his breakfast. A convenient and most romantic spot for this is on some crags about half way, where there is a small spring just below the path to the north. So far the difficulties of this route have consisted mainly in the fallen trees; but beyond this, both in and out of the forest, it becomes so rocky in several places, as to be totally inaccessible to ponies, and very difficult to jumpans. On leaving the forest, there is a rapid descent of about 600 feet to some crags, under which a multitude of sheep are tended, and on which will be found a very pretty white Sedum or Sempervivum, and the shrubby Polygonum graminifolium: after this four miles of pleasant walking along and down the southern and grassy face of the mountains, latterly through cultivation, lead to Muteeana bungalow, 7,900 feet, which

having neither doors nor window-frames, offers but a cold welcome, with a roof, too, resembling the sieve of the Danaides: they manage these things better in the plains and in Kemaon; but a decree has I believe gone forth for the erection of a new bungalow in a more convenient site than the present, which is more suited to the herald Mercury than to the mortal, weary, and thirsty traveller. It was the full intention of the late Major Broadfoot, C. B., to open the Pugdundee route, so greatly superior in scenery and shade to the made road, which, besides being nearly two miles longer, dips deeply into the hot glen below Muteeana, and is uninteresting till within a few miles of Nagkunda. It will always, nevertheless, be necessary as the winter medium of communication with Kotgurh, when the northern exposure of the mountain is buried in snow. In this warm glen, and in that of the Girree, grows the shirsha, a species of Acacia, perhaps A. smithiana, with flowers in May of the size of A. speciosa or Lebekh, the Siris of the plains, except that its long tassels of stamens are rose-coloured, and that it has not the delightful lemon fragrance of the latter. The shirsha greatly resembles A. julibrissiu (i. e. gul-i-reshm or silk-flower), a Persian species, which is naturalized about Como. In the same glen will be found the pretty little Parochetus oxalidifolia or communis, the Cedrela serrata, Populus ciliata; and in the cornfields on the way side, the Nepal wall-flower (Erysimum robustum), Silene inflata, Carduus nutans (the fine purple thistle), &c.

October 2nd.—To Fagoo, fifteen miles in five hours: the road rises to the Punta Ghatee, 8,500 feet, 100 feet above which to the right, stands a ruined post of the Ghoorkalees, who near this inflicted a decisive defeat on the mountaincers. Hence it descends and makes a great circuit to, and up the Kunag Ghatee, 8,400 feet, with the Teeba, 300 feet higher to the right; it then passes a little under Theog, and reaches Fagoo by a long but gentle ascent. Except some koil and oak woods below Theog, and the forest of Mohroo oak on the Kunag mountain, there is but little wood in this stage; the Mohroo oak (Quercus dilatata) considerably resembles the beautiful evergreen oak of Nynee Tal, and the Binsur and Gagur ranges in Kemaon, where it is known as the Tilonj, Kilonj, or Timsha: it is the Quercus kamroopii of Don's prodromus: this botanist was afterwards inclined to identify the two trees, but they differ considerably in several particulars. A few specimens

of Quercus kamroopii may be seen on a south aspect at Simla on the lower bazar road, near Lord Combermere's bridge: and far down in the vallies grows the "Banee," (the Funiyat of Kemaon), or Quercus annulata, which Don calls Quercus phullata. The handsome globe-thistle, the Echinops cornigera, is very abundant on the sunny rocks of the Punta and Kunag ghats, and Morina longifolia flourishes on the Kunag Teeba: neither of these plants occurs nearer Simla, though Muhasoo would at first sight promise them: but the neighbourhood of the plains seems inimical to many Himalayan plants: just as thyme is plentiful at Almorah, but unknown at Nynee Tal and the Gagur, with a much more favourable elevation. The Iris decora is common on the grassy slopes of the Kunag mountain, and towards Fagoo, the Spiræa cuneifolia, "Takoo," in May and June, whitens as the roadside-like hawthorn. The red Potentilla (P. nepalensis) and the deep-blue Cynoglossum furcatura abound at Theog, and tufts of the delicate little Androsace sarmentosa hung, as at Simla, from the sunny rocks.

This stage is generally decried as the most uninteresting near Simla, and it is assuredly rather bare: yet the views are fine; the bold bare precipitous peak and ridge of Shallee, like a lion couchant, are no where seen to such advantage, and are novel features in the more usual scenery of Simla. On the left hand are the snowy range, Jummootree, and the Choor; and latterly in the same direction the great northern spur of this last "cloud compeller" with its seamed and scarped flanks, pleasant meadows, and beautiful woods, reminds the traveller towards Mussooree, of one of the most picturesque excursions short of the snows; and the botanist, of Trillium govanianum, Actæa acuminata, Paris polyphyllum, Podophyllum emodi, and several Polygonatums and Smilacinas, which Fraser, by a pardonable deviation from botanical orthodoxy, calls the lily of the valley. The mountaineers commonly distinguish the Choor as the "Choor-chandnee" or "crest of silver," the original having no reference to any abstraction of silver spoons, as some, impelled thereto by Indian experience, have supposed. The summit exhibits the only granite hitherto discovered amongst the outer ranges of the NW. mountains, and is apparently a continuation of the line of granitic out-breaks traced by Mr. Batten in Kemaon, inside of the Gagur, which, in all likelihood, owes its superior altitude to the vicinity of this great natural lever. The granite of the Choor is,

however, somewhat different from that of Kemaon and the snowy range; and it is a remarkable fact, that this last (I speak from specimens of the vast precipices of Sookhee, near Gungootree) is identical in its abundance of felspar and black schorl crystals, with the granite of the Ajmeer hills; where, by the way, is an example never yet, I think, published, fully as conclusive on the igneous origin of this rock as the more celebrated Glentilt in Perthshire. The exact locality is three or four miles west of Nusseerabad, on the way to Rajgurh, where the granite is seen penetrating the stratified rocks in a complete and very extensive network of veins, and in several places imbedding large masses of them, in a manner that must satisfy the most sceptical, it was once in a state of fusion. The Choor also, which like another Briareus, with a hundred arms, domineers over the outer Himalaya, is the nearest point to Simla, where we meet with the silver fir; and separated as it is by comparatively low ridges from the great ranges which form the natural habitat of the tree, the fact necessarily gives rise to speculations on its origin, and as in the similar case of the Alpaca and Llama of the isolated Cordilleras of the Andes, and its own Lagomys or tailless rat, induces the question whether nature does not necessarily and independently give birth "automate" to like forms of organization under similar circumstances. Every traveller in the colder tracts of the Himalaya must remark the resemblance of the genera to those of Europe: while, with very few exceptions, the species are different; so much so, that as Mr. Batten observes, though our oaks have acorns all right, the absence of the sinuous leaf of the English tree is enough almost to excommunicate our spinous brethren. The only exception to the above rule appears to be in New Holland, as compared with a like soil and climate in South Africa, where her productions, animal and vegetable, are so dissimilar in plan from those of all the world besides.

The homeward route from Muteeana to Simla may be agreeably varied by a diversion to the Shallee mountain. From Muteeana to Bhogra, 1,500 to 2,000 feet below its summit, is a walk of six or seven hours by a path scarcely practicable for ponies. Back to Fagoo, via Kiarree, is about the same distance, including a long and tiresome ascent from the Nawul Khud: or one may return to Simla direct by Deotee in the Kotar state. Bhogra is the most southern of the cluster of five villages visible from Fagoo, on the east face of Shallee, the property of

the Thakoor of Kiaree Mudhan. Though very steep and rocky, there is no difficulty in the ascent to the summit, (9,623 feet above sea level,) where Bheema Kalee or Devee 'towers in her pride of place', in a small octagonal temple, and as nature personified, enjoys, when she pleases to look out, an exceedingly extensive and impressive view of her own works and votaries. Her character and attributes seem as severe as those of the Taurian Diana; and the mountaineers, who scarcely acknowledge any other god or goddess, hold her in such awe, that I have known one of them positively refuse to approach nearer than 300 or 400 yards to her fane, though it was our only shelter from a cutting blast. Hence, no doubt, she is said in Hindoo mythology to be the daughter of Himalaya. The entire northern face of Shallee is covered with dense forest, amongst which the Cupresseus torulosa is found in considerable quantity, being the only site in these Provinces where it appears to be truly indigenous. The day-lily, Hemerocallis disticha, is common by the watercourses, as is the Abelia triflora on the warmer exposures. On the summit grow Ephedra saxatilis—"syr"—and a silvery Artemisia, very like the A. rupestris of the Rhine.

"All things are full of error" said one of the ancients; and it is at best but a quixotic procedure to wander out of one's way to refute it, at the imminent risk of encountering controversial wind-mills, Biscayans, or Crowderos; and truth when found, may, like Mademoiselle Cunégonde, prove less attractive than had been anticipated. All that can be done discreetly is to knock an error on the head when met privately; and it may be accomplished with the less scruple on this occasion, as the present is, so far as I know, the only one into which the late Captain Herbert has fallen. I allude to his Geological Map of our Himalayan Provinces, where Shallee is included in the micaceous slate district; whereas it is in fact, one great mass of very compact, splintery, light-blue limestone, apparently very pure, with the exception of a small proportion of magnesia. Several plants will be found, which are, I think, peculiar to limestone, as Cytisus flaccidus. The mountain is very deficient in springs, and in the warm season is dependent for water on the pits called "Jors," which is of so vile a quality, that all Hudor-men-ariston men should carry up a supply from the Nawul stream.

October 3rd.—To Simla. The distant view of the hospitable homes of our countrymen identifies our feelings with those of the Mesopo-

tamian soothsayer, and we adopt afar off his exclamation—'How goodly are thy tents, O Jacob, &c.' but the nearer and beatific vision of the bazaar and its brimful stores, exalts our enthusiasm to the pitch of the wizard of the north, and we end our pilgrimage by a gastronomic application of his famous lines.—'Breathes there the man, &c.' Those heaps of flour and Shajehanpoor sugar are worth more than the purest cones of snow in the frosty Caucasus; those gram-fed fleeces than its shaggiest woods; those cases of aqua-vitæ, more soul-satisfying than its loudest water-falls. Rapt into future dinners, the Deotahs of the unfriendly rocks and snows of Emaus descend to insipid nonentities in comparison of Messrs. Barrett and Company, who are confessed the true dispensers of the good things of this life to all who can pay for them and to some who cannot.

Rough Notes on the Zoology of Candahar and the neighbouring Districts. By Captain Thomas Hutton, *of the Invalids, Mussoori; with Notes by* Ed. Blyth, *Curator of the Asiatic Society's Museum.*

(Continued from Vol. XIV, p. 354.)

No. 20. The Wild Hog. These are plentiful among the high rushes at the lower extremity of the Bolan Pass, where they conceal themselves during the day, but issuing forth at night, they proceed to ravage the cultivation around Dadur. They are also numerous in similar covers on the Helmund and in Seistan around the lake.

They are hunted but not eaten. They do not appear to differ from the common wild hog of the Upper Provinces of India.[22]

22. In Mr. Gray's catalogue of the specimens of mammalia in the British Museum, the "Indian wild boar" is styled *Sus indicus:* and Mr. Elliot had previously pointed out the following differences between it and the European one. "The Indian wild hog," remarks the latter naturalist, "differs considerably from the German. The head of the former is longer and more pointed, and the plane of the forehead straight, while it is concave in the European. The ears of the former are small and pointed, in the latter large, and not so erect. The Indian is altogether a more active-looking animal; the German has a stronger heavier appearance. The same differences are perceptible in the domesticated individuals of the two countries." (*Madr. Journ.* No. XXV, 219.) Vide Cuvier's 'Ossemens Fossiles', pl. lxi, for figures of the skull of the European hoar, but which would seem to have been taken from a domestic individual.

In the Society's Museum are two very different forms of Indian wild hoar skulls, especially characterized apart by the contour of the vertex and occiput. In a particu-

I heard of an animal, however, which had been killed near Washer, on the frontier towards Herat, and at the death of which my informant was present, which leads me to suppose (if the story be true,) that the "Babaroussa" (*Sus babaroussa,* Linn.), or some allied species, is an inhabitant of those parts. My informant was one of the party who accompanied the Candahar Sirdars as far as Washer, on their disastrous expedition against Herat in the years 1838-9. He described the animal as like a hog, with tusks and *two horns on the nose;* now the Babaroussa, according to Fred. Cuvier, has four tusks, two of which, by piercing through the skin of the muzzle, give the animal the appearance described by my informant. He declared, that it charged the party of hunters and overthrew a horse, but was shot and speared before it could do further injury. I have seen no spoils of the animal, and merely give the story as I heard it, from one who, by the way, was found in other respects, like most of his countrymen, to be an unblushing fabulist.[23]

Wild hogs are plentiful in Scindh, and especially around Shikarpore.

No. 21. *Hystrix cristata.* Common Porcupine.

This animal is very abundant around Candahar and in the neighbouring districts; it hides in the deep fissures and caves which abound in the limestone ranges that divide the valleys, and issuing forth at night-fall, they commit sad havoc in the grain-fields and gardens. They are entrapped in pit-falls, and likewise shot. I once asked an Afghan if he would eat one, and he replied with a start of astonishment—"*toba,*

larly fine specimen, from Cuttack, measuring fourteen inches and a half above, along the mesial line to tip of nasal, and the lower tusks of which (withdrawn from their sockets) measure seven inches and a half long following their curvature, the vertex narrows posteriorly to an inch and three-eighths; whereas, in another skull of the same length, or a trifle longer, with lower tusks measuring six inches and a quarter, the vertex is two and a quarter across where narrowest, and the whole vertical aspect of the cranium is broader and more convex. Where the latter specimen was obtained I cannot learn; but I have seen others like it from Bengal and Arracan.

Wild hogs are very generally diffused throughout India, and they occur in the Himalaya at all altitudes. Mr. Hodgson informs us that there are not any in Thibet; but in the country of the Usbegs they would appear to be very numerous. Thus, Lieut. Wood, in his 'Journey to the Source of the Oxus,' mentions that—"Descending the eastern side of Junas Durrah, our march was rendered less fatiguing by following hog-tracks in the snow. So numerous are these animals, that they had trodden down the snow as if a large flock of sheep had been driven over it." They are also common in Persia, and in the countries eastward of the Bay of Bengal.—*Cur. As. Soc.*

23. Possibly a species of *Phachochœres.*—*Cur. As. Soc.*

toba, look at the animal's feet; do you not perceive the similitude to your own?" And he then proceeded seriously to inform me, that once upon a time, there lived a race of men so exceedingly wicked, that God at length laid his curse upon them and changed their forms to that of the porcupine, obliterating all trace of the human form divine, except the feet, which were left to mark the accursed and fallen race, and to serve as a warning to other evil doers. The hollow quills which form a tuft on the tail, are said, by the marvel-loving vulgar, to be used for the purpose of carrying a supply of water, but how the animal is to make use of the same is not stated; their true use, however, appears to be to give warning of approaching danger, and to alarm an assailant, as they emit a loud rattling noise when shaken.—"Sahee" of India.[24]

No. 22. [*Alactaga acontium*, (Pallas): *A. indica*,[25] Gray, *An. and Mag. Nat. Hist.* Vol. X, 262]. The Jerboa. This beautiful little animal is abundant over all the stony plains throughout the country, burrowing deeply, and when unearthed, bounding away with most surprising agility after the manner of the Kangaroo. It was known throughout the army by the name of the Kangaroo-rat. They are easily tamed, and live happily enough in confinement if furnished with plenty of room to leap about. They sleep all day, and so soundly, that they may be taken from their cage and examined without awaking them, or at most they will half-open one eye in a drowsy manner for an instant, and immediately close it again in sleep. The Afghans call it "*Khanee*." It retires to its burrow about the end of October, and remains dormant till the following April when it throws off its lethargy and again comes forth. It is doubtless the "*desert rat*," mentioned by my friend the late Captain Arthur Conolly, in his Overland Journey to India, (page 54, Vol. 1.)

No. 23. *Gerbillus Indicus*. The Indian Gerbil.[26]

24. The species of *Hystrix*, as the genus is now limited, are greatly in need of elucidation; I am of opinion, that several are at present confounded under *H. cristata* and *H. leucura*, and I have been endeavouring for some time past to collect more extensive data for determining those of India. The Afghanistan species, as figured by Burnes, has a black crest, and a much longer tail than the true *cristata*, or than either of the Indian species with which I am at present acquainted, which latter are at least two, if not three, in number.—*Cur. As. Soc.*

25. It certainly does not occur in "India."—*Cur. As. Soc.*

26. Two species of Indian Gerbils have been indicated, but their distinctions are by no means satisfactorily made out. Mr. Waterhouse, in *Proc. Zool. Soc.* 1838, p. 56, has endeavoured to characterize a *G. Cuvieri*, with tarse an inch and three-quarters long, though smaller than a specimen of *G. indicus*, in which the tarse measured but one

These beautiful field rats abound at Neemuch and about Muttra; as likewise in the sandy tracts north of the city of Bhawulpore, where the country is absolutely riddled with their burrows. I think I have somewhere read that they live singly, i. e. that each pair is found separately and widely scattered over the plains; but this is incorrect, for they form large colonies like rabbits, and live in regular warrens wherever they are located; these colonies are usually situated in the neighbourhood of cultivation, which suffers much injury from their depredations. It has also been said that they do not venture out in the day-

and a half. He remarks, also, that "in the specimen of *G. indicus*, and that of *G. Cuvieri*, belonging to the Zoological Society's Museum, there is a considerable difference in the colouring, the latter being paler, and of a much brighter hue than the former; but whether this difference is constant," he adds, "I am not aware."

Mr. J. E. Gray, in his 'Catalogue of the Mammalia in the British Museum,' identifies Mr. Elliot's *G. indicus* of S. India (*Madr. Journ.* No. XXV, p. 211), with the *G. indicus* of Waterhouse, but applies to it the name *Hardwickii*; reserving the appellation *indicus* for some Bengal specimens presented by the late Major Gen. Hardwicke, while he makes no allusion to *G. Cuvieri* of Waterhouse, as if regarding this as a third Indian species, not in the British Museum collection. Specimens from S. India, however, presented to this Society by Mr. Walter Elliot, of the Madras C. S., (who also supplied the British Museum,) differ in not the slightest respect from at least one Gerbil of Lower Bengal. Of two specimens of the latter, from the vicinity of Berhampore, (for which the Society is indebted to the obliging exertions of my friends Capt. Thomas, 39th N. I., and Dr. Young,) and which accord in their general dimensions, one has the tarse to end of claws fully an inch and three-quarters, the other but an inch and five-eighths; though the former is the more usual admeasurement in the full grown animal.

It would seem, however, that we have a second species in Lower Bengal, which I take to be *G. Cuvieri* of Waterhouse, and the skull of which corresponds exactly with that of Capt. Hutton's species, No. 24: having the auditory *bullæ* considerably more voluminous than in *G. indicus*, and the incisive tusks larger and longer, and fronted with much paler enamel. Long ago, as mentioned in *Jour. As. Soc.* XI. 890, I found the remains of one of these animals in a paddy-field, half devoured by some carnivore: of this I preserved the skull, and what I could of the skin, with the tail and limbs; but I unluckily gave the fragment afterwards to some *shikarree* who was to have endeavoured to procure others, but of whom I never heard again. At that time I had no suspicion of the existence of a second species of Bengal Gerbil, and it is only very recently that I have succeeded in procuring Bengal specimens of the other.

Captain Hutton's species, No. 24, agrees so very nearly with the common Indian Gerbil, that I can perceive no very satisfactory external distinctions. The tarse, however, to end of claws, of an adult male, barely exceeds an inch and a half long; the general colour is also much paler, both of young and adults; and the fur generally is longer, especially that growing on the tail: the anterior limbs are either white, or have but a faint tinge of colour; whereas the hue of the back is, I think, always tolerably deep on the fore-limbs of *G. indicus*. The surface hue of the upper parts is of that light arenaceous, so very prevalent among the animals of Scinde and Afghanistan, as among those of Egypt and other sandy and stony countries.—*Cur. As. Soc.*

time, but this too is incorrect, for they may be seen the whole day through, popping out of their holes, nibbling the long grasses, and bounding off from hole to hole. This is the desert rat of Elphinstone's Cabul. (See Introduction.)

No. 24. *Gerbillus* [*Cuvieri* (?), Waterhouse.][27] This species is plentifully scattered over the arid and stony plains of Afghanistan, but they do not form colonies like the last named. The Afghans call it "Juwee." A full grown male specimen measured nine inches, and the tail seven inches and a half, equal to sixteen inches and a half over all. This, like the last, although perhaps strictly speaking nocturnal, is nevertheless active during the day, popping occasionally out of its hole to feed. They form no colony, but are numerously scattered in pairs over the plains.

No. 25. *Gerbillus* [*erythroura*, Gray, *An. and Mag. Nat. Hist.* Vol. X. 266]. This likewise is abundant over the same tracts as the last, and goes by the same name; it is more abundant around Quettah, while the former affects the tracts around Candahar. All burrow in the ground, and are seen during the day at times. The nails of the feet in this last are black, but in the former (No. 24) they are white or colourless in living specimens.

N. B.—You will see one specimen of *Gerbillus* distinguished by a X on the enveloping papers, No. 25½. It is, I consider, the same as No. 25, the black colour of the nails being, however, the consequence of death, for in the living specimen they were colourless. Found in wide stony plains with the habit of the last.[28]

No. 26. *Arvicola* [*Mus Huttoni*, Blyth.][29] I am doubtful whether

27. Vide preceding note, No. 26.—*Cur. As. Soc.*

28. I do not think that it differs from No. 25.—*Cur. As. Soc.*

29. This belongs to a particular and very separable division of *Mus*, having much the appearance and also the habits of *Arvicola*. Among Indian species, it comprises the *M. giganteus* of Hardwicke, or great Bandicoot-rat, and the presumed *M. indicus*, Geoff. (v. *Arvicola indica*, Hardw., *M. kok* of Gray, and *M. (Neotoma) providens* of Mr. Elliot's catalogue.) The latter naturalist having expressed to me his intention of applying a particular name to this group, I shall not forestall him in so doing; but I entirely agree with him in the propriety of the separation. Mr. Gray (in *M. N. H.* 1837, p. 585,) regards it as the typical form of *Mus*.

In size and proportions the present species bears a near resemblance to *M. indicus* (v. *kok*), but the tail is shorter, and the general colour much lighter, resembling that of the Gerbils. On comparison of the skulls, the zygomatic arch is seen to be conspicuously broader anteriorly; and the palate is much narrower, and contracts to the front: but the most obvious distinction consists in all the teeth, both incisive tusks and grinders, being considerably broader and stronger. In other respects the skulls of

this is *A. indica* of Hardwicke or not. It occurs south of Bhawulpore, and is abundant in Afghanistan from Quettah to Girishk, throwing up the mould after the manner of the mole. It feeds on herbs and seed, and burrows in the ground beneath hedge-rows and bushes, as well as along the banks of ditches. Its nest is deep-seated, and it constructs so many false galleries immediately below the surface, that it is difficult to find the true passage to its retreat, which dips down suddenly from about the middle of the labyrinth above. In the gardens and along the sides of water-courses in the fields at Candahar, their earth-heaps are abundant.

No. 27. *Mus* [*bactrianus*, Blyth, *n. s.*][30] This is the common house mouse of Candahar, but the house rat is I believe unknown there; at least so all my informants agreed in stating, and I certainly never saw one, although for two years I was in charge of extensive grain godowns, which would naturally have attracted them had any existed.

No. 28. *Lagomys* [*rufescens*, Gray, *An. and Mag. Nat. Hist.* X, 266.][31]

these two species bear a very close resemblance. Length, minus the tail, about six inches: the tail (vertebræ) four: tarsus, with toes and claws, an inch and three-eighths: ears posteriorly half an inch; to anteal base three-quarters of an inch. Fur soft and fine, blackish for the larger basal half of the piles, the surface pale rufescent-brown, deepest along the crown and back, pale below, and whitish on the throat: whiskers small and fine, and chiefly black: tail naked: feet light brown: incisive tusks buff-coloured, the enamel of this hue partially worn away on those of the upper jaw.—*Cur. As. Soc.*

30. This little animal presents a very close approximation to *M. musculus* in size, proportions, and structure, inclusive of the conformation of the skull; but the fur is much denser and longer, and its colouring absolutely resembles that of a pale specimen of *Gerbillus indicus*, except that there is no whitish about the eyes, nor is the crown of a deeper hue, and the tail is thinly clad with short pale hairs to the end. Comparison of recent specimens would probably elicit some further distinctions from *M. musculus*, especially in the larger eye, and somewhat more produced muzzle; but I cannot venture upon describing such differences from a single skin. The entire under-parts and feet are white; and the upper parts light isabelline, with dusky extreme tips to the hairs, and their basal two-thirds deep ashy.—*Cur. As. Soc.*

31. Length about six inches: tarsus to end of claws an inch and three-eighths. The skull exhibits good specifical differences from that of *L. Hodgsoni*, nobis, *J. A. S.* X, 816; being in particular much narrower between the orbits. Mr. Gray, in his 'Catalogue of Mammalia in the British Museum,' refers *L. Hodgsoni* to *L. Roylei* with a mark of doubt; and afterwards seems to identify it with *L. nipalensis*, Hodgson —a very different species; but the plates to accompany the descriptions of *L. Hodgsoni* and *L. nipalensis* were unfortunately transposed. *L. rufescens* exhibits the same sandy colouring so prevalent among the animals of Scinde and Afghanistan, and also those of Egypt.—*Cur. As. Soc.*

This species inhabits the rocks of Afghanistan from the Bolan Pass, where they were first seen, to Girishk and elsewhere northerly. They shelter beneath ledges of rock, and make their nests in the fissures, where it is next to impossible to get at them; and although I paid high for all specimens, and kept two men purposely to bring me the productions of the country, I only succeeded in procuring two examples of this animal, one of which escaped during the night; the other I send for inspection. It is probably the "Coney" of Scripture.[32]

No. 29. [*Myospalax fuscocapillus; Georychus fuscocapillus*, Blyth, *J. A. S.* XI, 887.][33] The Quettah *Mole*, as it was commonly called, is I think, a species of *Aspalax*; it burrows like the mole, throwing out heaps of earth. It is difficult to dig out, and is said to make long horizontal galleries, with earth-heaps thrown up at intervals. It probably feeds upon bulbous roots with which the plains around Quettah abound, such as red and yellow tulips, &c. I never saw or heard of the animal except around Quettah in the valley of Shawl, about 5,500 feet above the sea level, and I am indebted to the kindness of Lieutenant Holroyd, 43rd Light Infantry, for the specimens which are sent for inspection.

No. 30. *Lepus*———— ? Hares are common all over the plains, and I kept several tame ones at Candahar. I have, however, unfortunately lost my notes, and have preserved no specimen. It is said by several who have written upon Afghanistan, that there are two species, a large and a small one, the latter somewhat like a rabbit. I cannot positively deny the correctness of this assertion, although I have strong doubts on the subject; the small hares that I saw both at Quettah and Candahar, being nothing more than immature specimens or leverets of the same species, and I suspect that observers have mistaken the *Lagomys* for a small hare, an error by no means of infrequent occurrence. They are said to be remarkably strong and swift in some parts of the country, and the dog that can catch one single-handed, is reckoned a good one. Having neither notes nor specimens to refer to, I cannot pronounce upon the species, though it appears from memory to correspond with the

32. The "Coney" of our English version is, beyond doubt, the *Hyrax syriacus*, Schreber.—*Cur. As. Soc.*

33. This type differs from *Myodes*, or the Lemming genus, in the much greater size and strength of the feet, in the elongation and protrusion of its upper incisive tusks, &c. I will describe it more particularly with some other new rodents.—*Cur. As. Soc.*

common hare of the Deyra Dhoon. [*L. ruficaudatus*, Is. Geoff.] This, however, is conjecture. "Khur-gosh," i. e. *Ass-eared.*[34]

No. 31.—*Bos bubalus.*—The Buffalo is scarce and does not occur wild; the few that are kept are evidently from the east of the Indus, and are precisely the same as the domestic buffalo of the Bhawulpore country, where they occur in immense herds along the banks of the Garra. There they are kept for the sake of the milk and ghee, and during the heat of the day they forsake the jungles and repair to the river, where they immerse themselves in the water, leaving only the head on the surface. I know not if it be the same as the Mysore buffalo, but it differs greatly in its horns from those commonly met with in our Provinces. They are of large size, chiefly black, sometimes with a white forehead and white tip to the tail, which reaches to the fetlock, hairy on the neck and shoulders; withers not raised above the rump. Some are dun-coloured, and among these, also, the white forehead is occasionally seen. Irides often white; forehead prominent; the horns in all curving up strongly and closely from the base, and forming a curl at the side of the head instead of lying back along the neck, as in those of the Provinces. The only domestic buffaloes that I saw in Afghanistan were a few kept at Candahar, for the sake of the milk and ghee.[35]

34. From the skull of an immature specimen of the Afghan Hare in Capt. Hutton's collection, it is easy to perceive that the species differs from the northern Indian one: as is especially shewn by the greatly diminished horizontal elongation of the descending angle of the lower jaw, by the difference of the condyle, &c. It is only within a comparatively recent period that the common hare of Bengal and of the Upper Provinces has been recognised as a peculiar species by Zoologists. According to the observation of Mr. Vigne, it is remarkable that there are no hares in Kashmir. "One of the most singular facts connected with the natural history of the valley," writes that gentleman, "is that of there being no hares there. As a sportsman, I could not have believed it to be the case, as I have nowhere seen more likely ground. I am assured that they do not exist there, and I have never seen one myself, although I have traversed every quarter of the valley. It is probably too cold for the Indian hare; and that of the valleys of Thibet is an Alpine hare [*L. oistolus*, Hodgson, v. *tibetanus*, Waterhouse,] that has its dwelling amongst rocks, sand, and Tartarian furze. I should think that the European hare would thrive very well there."—*Cur. As. Soc.*

35. The above description applies better to the tame buffaloes of Italy and Hungary, than to those ordinarily met with in India; the former having besides a longer tail, and they are very commonly more or less marked and *splashed* with white. A skull of this race is figured in the '*Ossemens Fossiles*.' An Egyptian cow-buffalo which I saw in London approached more to the degenerate tame Indian breed, and had small, but elongated horns, similarly directed; and the late Mr. John Stanislaus Bell, (of 'Vixen' celebrity,) who favoured me with some interesting particulars respecting

No. 32. *B. taurus*.—The Cow is a handsome animal, and generally a good milcher; this is doubtless owing in a great measure to the rich artificial pastures on which they feed; the hump is generally reduced to an almost imperceptible rise at the withers, and in many it is not at all present. They are short-legged, and have good barrels, being altogether a far more European-looking breed than any native cattle on this side of the Indus. They do not appear to give the same quantity of milk in India, unless well fed.

No. 33. *B. pöephagus*.—The Yāk is seen to occur wild in the Huzara ranges, but for this I cannot vouch;[36] it has been said, by more than one traveller, also to occur wild in the higher parts of Kunawur and Tartary, and Lieut. Smith is quoted by Mr. Ogilby as having seen them wild on the confines of Bhootan; but these herds, I suspect, were nothing more than the tame yāks turned adrift, according to the custom during the summer, and left to roam at large until the winter sets in, when they are reclaimed and housed. The same custom may probably prevail among the Huzarrahs, and so have given rise to the tale of wild herds.[37] (Perhaps this is the "*Gow-cohi*"

many of the animals of Circassia, informed me, that the Circassian huffaloes "agree with the Italian in their hombed forehead, massive and ponderous conformation, and also in the abundance of excellent milk afforded hy the female, often for two years; but the horns, especially those of the female, are very large, inclined hackwards, much curved, annulated and serrated. The common attitude is that of the Indian huffalo, with the head horizontally held out; and the tail, with its terminal tuft, does not reach much more than half way to the ground. The young are of a dusky-hrown colour; hut the full grown are almost invariahly hlack, without a spot of white. Their stature exceeds considerahly that of the largest British cattle.

It should have heen premised, that I furnished Mr. Bell with sketches from life of the Italian and common domestic Indian huffaloes, the principal distinctions of which races I pointed out to him, and this drew his attention to the minutiæ which he has particularized. Certainly, the Italian tame buffalo is a very different looking animal from that of Bengal, and the huffalo of Afghanistan is evidently the same; hut the Circassian would seem identical with the ordinary (and wild) Indian race.—*Cur. As. Soc.*

36. My friend the late Sir A. Burnes replied to my inquiries on this subject. "The Yak is, I hear, wild in Pamir, or some animal very like it."—T. H,

37. Various authors have mentioned wild Yaks, though some at least of them have heen doubtless misled hy the circumstance mentioned hy Captain Hutton, of the tame herds heing turned loose in summer upon the mountains. According to Lieut. Irwin, "Yaks are found in a wild state on the Pamir, and on the upper parts of Budukhshun." Mr. Vigne also informs us, that there are wild Yaks on the northern slope of the mountains towards Yarkund:" and Timkowski mentions, that this species "is found, hoth wild and tame, in the western frontiers of China, in all Tangout and Thibet." So Captain Broome assured me, that he heard of wild Yaks heing seen ahout Rodok, said to be in herds, and exceedingly savage and dangerous to travellers in the passes.

of the Persian physicians, also *Gowzen;* vide Cuvier's 'Synopsis Mammalium.')

No. 34. To the Horses I paid no attention, but believe there is no good breed proper to Afghanistan, or at least not in the neighbourhood of Candahar; all coming from other countries, as Herat, Toorkistan, &c.

No. 35. *Asses* are as common at Candahar as elsewhere, and do not differ from their brethren of other more civilised countries; they are used as beasts of burthen, and have no more mercy shown to them than elsewhere.

Of the many notices I have seen of the habits of this animal, one of the most interesting is that given by Lieut. Wood. "The Yak," he remarks, "is to the inhahitants of Thibet, and Pamir, what the Rein-deer is to the Laplander of Northern Europe. Like the Elephant, he possesses a wonderful knowledge of what will bear his weight. If travellers are at fault, one of these animals is driven before them, and it is said, that he avoids the hidden depths and chasms with admirable sagacity. His footing is sure. Should a fall of snow close a mountain pass to man and horse, a score of yaks driven ahead answer the purpose of pioneers, and make, as my informant expressed it, a 'king's highway.' In this case, however, the snow must have recently fallen, for when its surface is frozen over and its depth considerable, no animal can force its way through it. Other cattle require the provident care of man to subsist them through the winter; hut the *Kash-gow* is left entirely to itself. He frequents the mountain slopes and their level summits. Wherever the mercury does not rise above zero, is a climate for the yak. If the snow on the elevated flats lies too deep for him to cross the herhage, he rolls himself down the slopes, and eats his way up again. When arrived at the top he performs a second somerset, and completes his meal as he displays another groove of snow in his second ascent. The heat of summer sends this animal to what is termed the old ice, that is to the regions of eternal snow; the calf heing retained helow as a pledge for the mother returning, in which she never fails.* * * The *Kash-gows* are gregarious, and set the wolves, which here ahound, at defiance. Their hair is clipt once a year in the spring. The tail is the well known *chowry* of Hindoostan; hut in this country, its strong, wiry, and pliant hair, is made into ropes, which, for strength, do not yield to those manufactured from hemp. The hair of the hody is woven into mats, and also into a strong fahric, which makes excellent riding trowsers. The milk of the yak is richer than that of the common cow, though the quantity it yields is less."

It is a very prevalent opinion, that the Yak has never yet heen taken alive to Europe. But Captain Turner long ago stated,—"I had the satisfaction to send two of this species to Mr. Warren Hastings, after he left India, and to hear that one reached England alive. This, which was a hull, remained for some time after he landed in a torpid and languid state, till his constitution had in some degree assimilated to the climate, [or had got over the effects of the long voyage,] when he recovered at once, hoth in health and vigour: he afterwards hecame the sire of many calves, which all died without reproducing, except one,—a cow, which bore a calf by an Indian hull. Though naturally not intractable in temper, yet soured hy the impatient and injudicious treatment of his attendants, during a long voyage, it soon hecame dangerous to suffer this hull to range at liberty abroad, for which reason, after destroying a valuable horse, he was finally secured alone."—*Cur. As. Soc.*

Dozens of these animals are driven into Candahar every morning during the fruit season, each carrying a pair of panniers loaded with grapes, figs, pears, peaches, apricots, nectarines, plums, cherries, green-gages, and melons. Latterly, also, from the difficulty and expense of procuring camels for commissariat purposes, we used to hire asses, and found them to be quick travellers, under loads of two puckah maunds each, (160lbs). The Bokhara breed is very large and often white. These animals are subject to swellings or tumours in the throat, from which secretions of lime are extracted, often as large as a pigeon's egg, and formed similar to the gravel stones in the human bladder. I send one for analysis.[38]

No. 36. Mules are good, and often high-priced, especially riding mules, which sometimes sell from 250 to 300 Co's. Rs. each. I do not think any are bred in Afghanistan, but suspect they come from Mooltan and the Punjab.

No. 37. *Equus hemionus.* The Gorkhur, or wild Ass, I never saw, but it occurs in the southern deserts, and in Gurmsail; also in the neighbourhood of Herat and in Persia. It is difficult to capture alive. They occur also in Cutchee and in Guzerat. I heard a Bombay Engineer Officer state *as a fact*, which he backed moreover by the authority of Capt. Harris, of the same Presidency, (Author of 'African wild Sports') that *stallions* of the wild ass were very seldom met with, and the reason assigned was, that *as soon as the young one was born, the old stallion immediately castrated it with his teeth!!* This very marvellous story was evidently believed by the gentleman from whom I heard it, but I strongly suspect that if it really originated with Captain Harris, that Officer must have been quizzing. One very simple reason against the

38. Of this, Mr. Laidlay has favoured me with the following report:—

"The calculus submitted for examination weighed 237 grains, and had a specific gravity of 1.81. Exactly in its centre was found what appears to be the husk of some grain, (paddy?) which served as a nucleus around which the chalky deposit accreted in concentric layers. Its composition is

Carbonate of lime, ...	89·0
Carbonate of magnesia, ...	1·9
Phosphate of lime, ...	1·6
Animal matter (mucus and albumen,) ..	7·5
	100·0

Corresponding with the ordinary composition of salivary concretions."—*Cur. As. Soc.*

truth of the story arises from the fact, that in newly born animals, the testicles are not apparent, nor do they drop for some time after their birth; nor is it at all likely that the stallion is in attendance as accoucheur, for the female knowing the propensity of the male to attack her offspring, would assuredly take the necessary precaution to prevent it. Besides, if this be the rule, the continuance of the race of wild asses, must be altogether fortuitous! The story speaks for itself; but I mention it as illustrative of what people, and clever people too, will swallow from the mouth of one supposed to be an oracle.[39] "*Ghorkhur*," quere from "*Ghora*," a horse, and "*Khur*," an ass, literally "Equus Asinus."

No. 38. *Cervidæ*. Of the true Deer there are none in the lower tracts of Afghanistan around Candahar, nor is there any cover for animals of this tribe, the whole country being a succession of bare hills and arid stony plains, with scarce a shrub of any kind larger than the camel-thorn. I was once informed, that the *Fallow deer* occurred near Herat, but acting on the hint and making every enquiry from competent authorities, I failed to get the least confirmation of the report, and believe my informant had never seen the fallow deer even in Europe.[40]

It may not be amiss to say a word here regarding the Hippelaphus of Aristotle, which Mr. Ogilby has applied to the Nylghau (*Portax picta*). I should not have ventured on the subject had not that gentleman pointed to the modern Punjab, as *Arachosia*, which Aristotle gives as the habitat of Hippelaphus. Finding no other animal in the Punjab, to which the description will apply, Mr. Ogilby decided that the Nylghau

39. Aristotle, as quoted by Colonel Hamilton Smith, remarks of the common Ass, that the more powerful males thus attack the weaker, "Tandiu illum persequuntur donec assecuti ore inter posteriora crura inserto testiculos ejus evellant." And for this reason, observes Colonel Smith, it is held dangerous to allow a male ass to pasture in the same field where there is a stallion. With the Ghorkhur, as with the Ass, the males fight with the teeth rather than with their hoofs; nor are they the only animals which evince a propensity for gelding their antagonist. Dr. Bachman relates the same of certain of the American Squirrels; and I have observed it in Shrews. There is an interesting notice somewhere in the 'Asiatic Review,' of a number of Ghorkhurs taken in pit-falls in Scinde or Guzerat; among which, I think it is remarked that not a single entire male occurred. In a note to Vol. XI, p. 286, I expressed doubt respecting the alleged identity of the "Kyang" of Tibet with the *Ghorkhur;* but the Society has recently received (from G. T. Lushington, Esq., of Almorah,) a nearly perfect skin of a Kyang, which completely settles the question in the affirmative.—*Cur. As. Soc.*

40. There is a magnificent true Elaphoid stag in Persia, known as the *Maral*, of which a pair were taken to England by Sir John McNeill, and deposited in the Zoological Gardens.—*Cur. As. Soc.*

must be the species alluded to. To this view of the case, I have to offer the following objections and suggestions :

1*st*.—As regards the country called "*Arachosia*," it would appear from various sources, and among others from Professor Lassen,[41] that Arachosia was part of the country called "*Ariana*," and situated in that part of Afghanistan of which Candahar is the capital. Such being the case, it is at once evident, that the animal alluded to by Aristotle under the name of Hippelaphus, could not have been the Nylghau, inasmuch as that animal does not anywhere occur within the limits of Afghanistan, and in all probability it does not even cross the Indus. The same remark will equally apply to the Saumer deer of India, and indeed to all the deer tribe, as none of them, as far as I could learn after two years' inquiry, are found in that part of the country.[42] It would seem proved, therefore, that neither the Saumer nor the Nylghau can be the Hippelaphus of Aristotle. Mr. Ogilby says, the name Hippelaphus is now applied to the Saumer, but in the English 'Régne Animal,' the specific title of "*Aristotelis*" is given to that animal. It is as yet undetermined, I believe, whether the *Saumer* and *Jurrow* are the same species or not, and until such is proved, the name of "*Aristotelis*" must apply to the latter deer.[43]

41. Journal As. Soc. Bengal, Nos. 86 and 101 passim.

42. The 'Arachosian Ox' of Aristotle is, beyond doubt, the Buffalo.—*Cur. As. Soc.*

43. Vide *Journ. As. Soc.* XI, 449, for some remarks on this subject, which further observation has confirmed, as regards the distinctness of the 'Jurrow' (*C. Aristotelis*), the 'Saumer' (*C. hippelaphus*, Cuv.), and the Malayan Rusa (*C. equinus*. Cuv.) The *Jurrow* is peculiar to the Himalaya, and its antlers are always much larger, and more divergent than in the others; and the prongs composing their terminal fork are generally about equal in length; sometimes the inner and sometimes the outer, being the longer. In the *Saumer*, which inhabits Bengal, Arracan, and the hill forests of Peninsular India (it being doubtless also the Cingalese species), the antlers very rarely, if ever, exceed two feet and a half in length, and are much less massive than those of the *Jurrow* ; of the prongs of their terminal fork, the outer is usually the longer. In the Malayan Rusa, inhabiting the Malay Peninsula and Java, the contrary obtains; the inner prong being usually *much* the longer, and the reverse of this is observable in a still greater degree in the common Axis or spotted deer. In addition to series of each of the above in the Society's museum, are three pairs of antlers of a Rusa, now common in the Mauritius, and which nearly resemble those of the Malayan *C. equinus*, but are remarkable for a strong sigmoid flexuosity of the beam. There are also two frontlets from Assam, which seem to be referrible to the *Saumer*, having the antlers unusually robust but short, and (as in ordinary *Saumer*) much less divergent than those of the *Jurrow*.—*Cur. As. Soc.*

2*nd*.—From Aristotle's description of the animal, and the habit furnished by him, as well as from Mr. Ogilby's remarks thereon, I would beg to suggest, that the Hippelaphus is nothing more than the "*Capra ægagrus*."

I found this opinion on the following facts, namely :—

1*st*.—Hippelaphus inhabits the country of Arachosia, in which the *C. ægagrus* abounds, but where neither the Nylghau nor the Saumer occurs.

2*nd*.—"The Hippelaphus," says the Greek philosopher, "has a mane (like a horse) above the shoulders, but from this to the head, along the top of the neck, *it is very thin;* it has likewise a *beard on the larynx;* it is about the size of a stag—the female has no horns—those of the male resemble the horns of the *Dorcas* (*Gazella dorcas*) :—it inhabits Arachosia." (Royle's Him. Bot., Mamm., p. 74.) Now a reference to the figure of *C. ægagrus* given in the 'Calcutta Journal of Natural History,' No. 8, will show the *mane* and *beard* alluded to by Aristotle; in the figure, however, the hair on the shoulders or withers is not represented long enough, nor so thick as in the living animal. This animal therefore possesses precisely such a mane as Aristotle describes, it being longest on the shoulder and growing thinner and shorter towards the head: it has likewise a long and bushy beard depending from the throat.

Mr. Ogilby, after declaring that it can be easily proved, that the *Dorcas* is the Gazelle of Egypt, goes on to say that—"Theodore Gaza, himself a Greek, and *the first translator of Aristotle*, very properly renders the word by *Capra*." Here then is a corroboration of my opinion, for according to Aristotle and his first translator, the *Hippelaphus* inhabited Arachosia, i. e. Candahar; it had a mane and beard; so has *C. ægagrus:* it has horns like the *Dorcas* or *goat; C. ægagrus* is a horned goat. The only dissimilitude is in the female having *no horns*, whereas all the specimens I have seen of the female *ægagrus* were horned. Even this, however, is in a measure nullified by the statement in the English *Régne Animal*, that the female has "*short or no horns*." If, therefore, the horns are sometimes wanting, it may have been from a hornless specimen that Aristotle's description was drawn up.

The *Capra ægagrus* will consequently be found in every respect to answer the description of *Hippelaphus*, both as to its appearance and habitat; while in the latter respect at least, neither the *Portax picta* nor

any of the Rusa tribe, can possibly agree, for none of them occur across the Indus or in Arachosia. The only wild ruminants that I could hear of in the country, were *C. ægagrus*, *C. megaceros* (nobis), *Ovis Vignei* (Blyth), *Gazella subgutturosa*, and in Cutchee and Upper Scindh, west of the Indus, the *Cervus porcinus*, *Gazella Bennettii*, and *G. Christii*. To none of these, with the exception of the first, can the description above quoted apply; and if it be rejected, then there remains no animal in Arachosia to which we can refer that notice. In the 'Penny Cyclopædia,' art. Ariana, we are informed that "Ariana was the general appellation given by ancient authors, subsequent to the age of Alexander the Great, to the eastern portion of those countries which form the highland of Persia. According to Eratosthenes, Ariana was bounded on the north by the Paroparmisus mountains, and their western continuation as far as the Caspiæ Pylæ; on the south by the great sea (the Indian Ocean); *on the east by the river Indus;* and on the west by the chain of hills which separate Parthyene from Media, and Karmania from Paraitakene and Persis. Its shape is by Strabo compared to that of a parallelogram, the dimensions of which, reckoned from the mouths of the Indus to the Paroparmisus, he estimates at 12,000 or 13,000 stadia; and in a straight line *from the upper Indus* to the Caspiæ Pylæ, on the authority of Eratosthenes, at 14,000 stadia; the length of the southern sea coast *from the mouths of the Indus* to the entrance of the Persian Gulf is stated at 12,900 stadia. The countries properly belonging to Ariana are, according to Strabo, in the east, the Paroparmisadæ, *the Arachoti*, and Gedroseni, along the Indus proceeding from north to south; the Drangæ towards the west of the Arachoti and Gedroseni; the Arii towards the west of the Paroparmisadæ, but extending considerably to the west and south, so as nearly to encompass the Drangæ, the Parthyæi west of the Arii, towards the Caspiæ Pylæ; and Karmania to the south of the Parthyæi."

From this it becomes abundantly evident, that Mr. Ogilby is altogether wrong in placing the modern Punjab within the ancient Arachosia, and consequently that his views with regard to the identity of *Hippelaphus* and *Portax picta* or Nylghau, are wholly inadmissible.

If therefore we reject the *Capra ægagrus* as Aristotle's *Hippelaphus*, the matter is left in more doubt than ever, for there is now no other

ruminant inhabiting Arachosia to which his description can possibly apply.

No. 39. *Cervus porcinus.* Hog deer — Parah. This species occurs abundantly in the preserves at Shikarpore, and is also found in the jungles of the Bhawulpore territory. While returning to Ferozepore by water from Sukkur, I saw a hog deer some miles below *Ooch*, suddenly spring off the bank into the river, and strike out for the opposite shore; shortly afterwards, the reason for this was apparent, as a common village dog took the water at the same place in pursuit of the deer. The river was here very broad, and must have been close upon two miles across as the animals were steering; the deer made good way, and kept well up against the current, which was running strong; the dog seemed tired and was carried far down the stream, and while he was still struggling in the middle of the river, the deer had gained the shore and galloped off to the jungle. I did not see whether the dog got across or not, as a turn in the river shut him out from view.

This animal does not occur in Afghanistan.

No. 40. The Nylghau—*Portax picta.* This is said to be found in the northern portion of the Bhawulpore country. It is not found in Afghanistan.

No. 41. *Antilope cervicapra*—Sarsinee, or Indian Antelope. It is said to occur in the northern portion of the Bhawulpore country, but does not appear to cross the Indus, and none are found in Afghanistan. It is common in the Upper Provinces of India and also at Neemuch. I do not think that this species is an inhabitant of the countries west of the Indus, and in Cutchee it appears to be replaced by the *Gazella Bennettii* and *G. Christii*, while again these two do not cross the mountain barrier into Afghanistan, but are there represented by *G. subgutturosa*, which extends into Persia. If this conjecture be true, it is probable that *A. cora* and *arabica* are distinct from *A. Bennettii?* This is hazarded however as a mere surmise.

No. 42. *Gazella Bennettii*—Ravine deer. Goat-antelope of Europeans; "*Chikara*" of Neemuch; Kalseepee of Mahrattas. *Gazella Cora? Antilope Arabica?*

This species is abundant at Neemuch, where it roams over the wide and sterile plains in small groups of five and six. The natives there call

it "Chikara" or "Shikara," a name which is elsewhere applied to the Four-horned Antelope. The female has horns, but these are very short and slender, and invariably crooked in growth; they are blackish and smooth, with slight indications of wrinkles at the base. The same species likewise occurs in Cutchee, but does not pass the mountains into Afghanistan.

No. 43. *Gazella Christii*, Gray.—This species approaches very nearly to the last named, and occurs in Cutchee also, but not in Afghanistan. A fine specimen was brought to me at Dadur, and the skull was carefully preserved and brought to this country with my other collections; but since my arrival at Mussoorie it has most unaccountably disappeared.[44]

No. 44. *Gazella subgutturosa*.—The Ahu. (N. B. The word "*ahu*," though applied to this species by the Afghans, is used only as a generic term; the specific name I cannot now remember, and my note is mislaid.)

Although I have referred the Afghan Gazelle to *G. subgutturosa*, still I do so with diffidence, on account of the remarkable difference between the horns of my specimens and the figure of a skull given in the English 'Régne animal.' In that work the horns bend *outwards* at the tip, and it is said in the text that such is their direction in the Persian *Antilope subgutturosa*. I am strongly inclined to think, that the horns on the skull figured in the 'Régne animal' have been transposed, namely, the right horn on the left core, for if they were again changed they would exactly represent the horns of the Afghan species. In my largest specimen the horns are fourteen inches long measured over the curve; they have twenty annulations, and are seven inches and a quarter apart at the tips, which turn inwards and almost form a hook; indeed, with the exception of the above difference in the direction of the horns, the two animals precisely correspond.[45] The *Ahu* of the Afghans is found from Quettah to Candahar and Girishk, and it probably extends thence viâ Herat into Persia; they are found in small flocks of six or seven, and roam over the wide and sterile plains of Afghanistan, occasionally committing great havoc in the grain-fields.

I do not know whether it extends upwards to Cabool, though such is probably the case, as I heard of its occurrence near Ghuznee. In the

44. For some notice of this species, vide XI, 452.—*Cur. As. Soc.*

45. The horns are those of a typical *Gazella*, rather stout, and abruptly hooked in at the tip.—*Cur. As. Soc.*

winter time they travel further south, and skirt the sandy desert which stretches along from the Sooliman ranges into Persia.[46]

In the young males, the horns nearly touch at the apex in consequence of their inward turn, but they afterwards separate and diverge as the animal advances to maturity.

As regards the female, however, if mine be in reality the Persian Gazelle, there is still greater difference between the Afghan species and the published description in the English edition of Cuvier's 'Régne Animal;' for it is there stated, that "the females have smaller horns, and are destitute of lachrymary sinus and of tufts on the knees;" In the Afghan Gazelle, on the contrary, the female is *hornless*; *she has a lachrymary sinus* as well as the male, and she has tufts at the knee, although they are perhaps smaller than in the male. In all other respects of marking, colour, &c. the description of Cuvier corresponds with my specimens, which I can regard as none other than *G. subgutturosa*, and I conclude that some mistake must have led to the erroneous account in the English 'Régne Animal.' I am the more inclined to believe this, since I find an equally glaring error regarding the "*Goral*" *(Kemas goral)*, it being stated that the female is *hornless* and possessed of only *two mammæ*, whereas she *has horns* (generally), and *four mammæ!*

The Afghans have a mode of catching or destroying these animals when they repair to a river to drink; a net is erected along the bank of the stream, and a single opening is left for the antelope to enter at; after satisfying their thirst the animals proceed to wander along the stream, and the ambushed hunters springing up and securing the opening or door way of the net, capture or kill the whole batch. The carcase was often brought into the market at Candahar and sold.

No. 45. *Ovis Vignei.* "Koh-i-doomba" of the Afghans—*O. cycloceros*, Hutton.

When I named this species, I was not aware that it had passed through abler hands, but of course my trivial name must give place to yours. I have nothing to add to my former account in the 'Calcutta

46. M. Menetries remarks, that this animal "is very common in winter on the vast Steppes which border the Caspian sea, from Bakou to Koo; living in small troops, which once a hundred and fifty paces from the hunter, remain tranquil and fearless. It is easily tamed, so that it may be suffered to run at large without danger of losing it."—*Cur. As. Soc.*

Journal of Nat. Hist.' The animal is abundant throughout the higher mountains of Afghanistan and is said to extend into Persia.[47]

No. 46. *Ovis steatopyga*—Var.—" Doomba," or broad-tailed sheep.

The domestic sheep of the Afghans are all *Doombas* or " broad-tails, but the development of this singular feature is dependent apparently upon climate and perhaps pasture, although certainly not to such an extent as some have supposed: for instance, Pallas ascribes it to the prevalence of wormwood in the pastures, but if such be the cause the feature should become larger or smaller according as such pasture abounded or decreased; why then have the sheep around Shawl and among the tribes which frequent the mountains of the Soolemaun range a *less* development of fat than those sheep which are found around Candahar, for wormwood and saline soils abound there? why again have the sheep of the Khyber Pass and Peshawur the broad tail, for wormwood I am told *does not occur there?* why have not the sheep of Upper Kunawur and Hungrung in the Himalaya, the broad tail, for wormwood *abounds* there, and forms one of the chief plants in the pasture of those elevated tracts?

The " Broad-tailed Sheep," which is but a variety of the " Fat-rumped" species, or " *Ovis steatopyga*," occurs throughout hill and vale, extending into Bokhara, Persia and Palestine; it occurs also with some modification in Africa and elsewhere. If the prevalence of wormwood and saline pastures had the effect of producing the broad fat tail of this breed, so ought they to have enlarged the tail of the wild race *(Ovis Vignei)*, and the Camels and other cattle which feed upon the same pastures; yet such is not the case.[48] Again, if the fat is engendered by such causes, it should disappear gradually when the exciting cause had ceased to operate, and by removing the *O. steatopyga* to pastures where neither wormwood nor saline plants prevail, the singular enlarge-

47. There is a brief notice and very passable figure of this species, taken from an animal killed in the vicinity of Persepolis, in Lieut. Alexander's 'Travels from India to England,' &c., p. 136 (1827): and I may take the present opportunity to remark, that the Society is indebted to the obliging exertions of G. T. Lushington Esq., of Almorah, for a noble specimen of the true *Ovis ammon* of Pallas, which is quite distinct from *O. montana* of N. America, and to which must be referred my *O. Hodgsonii*, founded on Mr. Hodgson's figure and description of the head and horns of a young ram, since called by him *O. ammonoides*.—*Cur. As. Soc.*

48. The fighting rams of India seem to me to be of a race descended from *O. Vignei*, of which they preserve the crescent-horns and short tail.—*Cur. As. Soc.*

ment of its tail should disappear and become as in other breeds. This however is also not the case, for the doomba has long been tended in different parts of India and other countries without a reduction in the size of the tail, which still continues enlarged as in the original stock. This fact, therefore, goes directly to establish the *O. steatopyga* as *a distinct* and *original species*, which has descended from none of the living stock, whether domesticated or in a state of nature.[49] Let us examine the grounds on which this opinion can be maintained. First, we find that sheep taken to the pastures of the broad-tails, do not gain an accession of fat on the rump and tail, but remain precisely as they have always been. Secondly, the broad-tails, when removed from their own pastures, do not lose the singular feature from which they take their name. Pasture, therefore, is clearly not *the cause* of this enlargement. Thirdly, proofs may be given that the *O. steatopyga* is the original breed confided to the care of men even from the dawning of his abode on earth. It is however contended, that all our domestic stock has sprung from some one of the existing wild races, and as regards the Sheep, the Musmon *(O. musimon)* is supposed to be the origin of our flocks.[50]— Now, if we are to attend strictly to the *generic characters* assigned by naturalists to the Musmon and our Sheep, we shall at once perceive the absurdity of assigning such an origin to the latter species,—for while all accounts agree that the true Sheep possess "*no lachrymal sinus*," and that they have *an interdigital hole or sac*;" the Musmon has actually been removed from the genus and ranked as a *Goat* by no less authority than C. L. Bonaparte, the present prince of Canino, because that animal *does possess a lachrymal opening*,[51] and becausc it possesses *no interdigital hole!*

If the absence of a lachrymary sinus in the domestic sheep *were true*, which it is not, the want of it would prove that none of the wild

49. Certainly not an aboriginal race, but one highly altered by domestication.—*Cur. As. Soc.*

50. Whether any long-tailed sheep, with horns describing more than a spiral circle, could have descended from the crescent-horned and short-tailed *O. musimon* (which is closely allied to *O. Vignei*), is extremely doubtful.—*Cur. As. Soc.*

51. The presence of a lachrymary opening proves, however, that it is not a Goat, because that genus does not possess it. T. H.—If I mistake not, (writing from memory,) the Prince of Canino states, that the *lachrymary sinus* is wanting in the Moufflon, as it is certainly is in *O. tragelaphus* and *O. nahoor*; whereas I believe all sheep possess the interdigital sinus (an easy mode, by the way, of distinguishing a leg of goat-mutton from one of *mouton proprement dit*).—*Cur. As. Soc.*

sheep known to us could have furnished the original stock, for all of them possess that character;—the assertion, however, that the genus *Ovis* does not possess the lachrymal sinus is erroneous, for both the broad-tails and every other domestic variety that I have seen, decidedly *possess it;* it varies in size in different breeds, but I will venture to assert that it will always be present. Still, notwithstanding the occurrence of a sinus both in the musmon and domestic sheep, the latter must nevertheless be a distinct species, because it possesses a character common to all sheep, but which in the musmon is wanting, namely, the interdigital opening sac.

Having given proof therefore that our domestic flocks have not been derived from the musmon, I shall now endeavour to establish my third position, by proving that that the *Ovis steatopyga* is a remnant of the original breed confided to man in the infancy of the world. I have already said, that I am inclined to think the *Ovis steatopyga*, with its varieties, as altogether distinct from the races now living in a state of freedom, and in this opinion I shall now attempt to trace back its origin from the earliest to the present time, leaving it to others to form their own conclusions from the facts here brought to their notice.

The earliest mention made of man's possessing flocks is in the 4th Chapter of the Book of Genesis, where, at the 4th verse we are informed, that Abel "brought of the firstlings of his flock," as an offering to the Lord.

Since then, at this early period, a sufficient number of animals were domesticated to enable man to offer up the daily sacrifices which it appears was then the custom, and since, moreover, we know that the animals were created especially for man's use and comfort, it is evident that some of the more useful races must have been placed from beginning under his controul as domestic stock, for it is clearly impossible that he could, by any exertions of his own, have captured and subdued a sufficient number of the wild mountain breeds, at the period alluded to, to enable him to offer up such sacrifices.

In this case, such cattle would necessarily have descended from generation to generation, even to the period when God commanded Noah to build the Ark, and they consequently formed part of the stock preserved alive with him, and became the foundation of his domestic flocks after the flood, and were diffused again with his descendants from the coun-

try where the Ark rested. They were therefore part of the stock which Abraham and Lot possessed, and which, after them, Jacob tended while serving Laban for his daughter Rachel. This opinion seems moreover to be well supported by the fact, that the general colour of the breed is the same now as in that early period; for we read that Jacob's hire was to consist of all the ring-straked, speckled, and spotted among the goats, and of all *the brown among the sheep;* and it is easy therefore, without the aid of a miracle, to see how his flocks increased while those of Laban diminished; since to this day, there are few domestic goats without some speck or spot of white, and since the prevailing colour of the Tymunnee broad-tailed sheep is brown of various shades!

It was indeed an arrangement well calculated then, as it would be still, to enrich the one party and impoverish the other, and if we only allow that Jacob was an observing shepherd, and had learned by experience that "*like breed like,*" the secret of his great success is at once made manifest.

With Jacob therefore and his sons, they were taken up into Egypt in the time of the famine under Pharaoh's reign, when the land of Goshen was allotted for a residence to the Israelites; and of course, from thence they accompanied that people throughout their wanderings into the promised land, after the Exodus from Egypt, and from thence again they became diffused through all the neighbouring states and kingdoms: unless, indeed, as is most probably the case, they occurred there already, as the nations which were then in the land had equally with the Israelites descended from the Ark.[52]

Now, that the sheep known to the Jews was the *Ovis steatopyga*, would seem to be amply proved from the 29th Chap. of Exodus, where, at the 22d verse, in describing the manner of a certain sacrifice to be offered up, it is written, "thou shall take of the ram *the fat* and *the rump*, and the fat *that covereth the inwards*, and *the caul above the liver*, and *the two kidneys*, and *the fat that is upon them*, and the right shoulder; for it is a ram of consecration."

Here there is evidently a marked difference made between the fat of the tail and the fat of the inwards and kidneys, for the words "the fat

52. So, Captain Hutton might also argue, are the aborigines of both Americas, of Australia, Polynesia, and the countries generally to the E. and SE. of the Bay of Bengal, in which latter Sheep have only recently been introduced, and are as yet possessed wholly by the European residents.—*Cur. As. Soc.*

and the rump," clearly show that they were distinct parts of the animal, otherwise it would have been written, "*the fat of the rump.*"

It is likewise held distinct from the fat of the other parts, as "the fat of the inwards" and "the fat of the kidneys." Now it is a notorious fact, that the fat here mentioned is literally all that the animal possesses, unless kept up and fed with grain, which Asiatics never do; so that the passage reads "the fat *tail* and the rump," &c. We have consequently a true description given us of the "*Ovis steatopyga,*" in which there is "a solid mass of fat on the rump, which falls over in the place of a tail, divided into two hemispheres, which take the form of hips with a little button of a tail in the middle."[53]

Again, all doubt upon the subject appears to be removed by a passage in the 3d Chap. of Leviticus, where, at the 7th and following verses, in explaining the method to be adopted in "offering up a sacrifice for a peace offering," it is written—"If he offer a lamb for his offering then shall he offer it before the Lord. And he shall offer of the peace offering an offering made by fire unto the Lord; the fat thereof *and* the whole rump, it shall he take off hard by the backbone; and the fat that covereth the inwards, and all the fat that is upon the inwards, and the two kidneys, and the fat that is upon them, which is by the flanks, and the caul above the liver, with the kidneys, it shall he take away."

Here then it will be observed, that not only is the distinction between the fat of the hinder parts, and of the inwards again repeated, but we are instructed more particularly that the tail was the part alluded to, since "the fat thereof *and* the whole rump," were to be taken "*off hard by the backbone,*" thus clearly pointing out the part where the fat alluded to was situated, namely, in the rump and tail, which takes its origin from, or is a continuation of, the end of the backbone.

It must farther be remarked, that the word "*and,*" written in italics in the Bible, does not occur in the original Hebrew, but has been added in the English translation in order to show the connection of the words "*the fat thereof,*" with those of "*the whole rump.*" Therefore, in the original, the passage would stand thus—"*the fat thereof, the whole rump, it shall he take off hard by the backbone;*" and that the fat rump of the sheep is the part alluded to is clearly proved by the word

53. Nat. Library.

"*it*;" otherwise if "*the fat thereof*," and "*the whole rump*," had been separate parts, they would not have been specified in the singular number, by "*it* shall he take off," but by "*them* shall he take off." We thus at once perceive, that the allusion is made to the peculiar formation of the hinder parts of the "*Ovis steatopyga*," in which the fat of the rump actually descends in two lobes on either side of the tail, which it so completely envelopes as to leave only the tip of it apparent, and thus while it contributes to form the broad tail which characterises the species, it still remains likewise a part of the rump, commencing at the end of, or '*hard by the backbone*,' as correctly alluded to in the above passage of Leviticus.

Further evidence, if such were necessary, may be probably gathered from other passages, such as that of the 15th Chapter of Samuel, where the prophet in reproving Saul, declares to him, "behold, to obey is better than sacrifice, and to hearken than the *fat of rams*." Now, since the Asiatic sheep are notoriously devoid of fat, unless kept up and fed, the repeated mention in the Scriptures of the fat of rams, would seem to point most particularly and plainly to the species under consideration, which thus becomes doubly interesting, as being not only an Antediluvian species, but a descendant from the original stock bestowed upon mankind by the Almighty in the earliest ages of man's existence upon the earth, and as being moreover the animal which was used in the ancient sacrifices of the Jewish people.

Thus we perceive, that so far from this animal having sprung from any living wild breed, it is in all probability the most ancient of all our sheep, and the stock from which the numberless domestic varieties which now contribute to the comfort of mankind, have themselves descended.[54]

In the same manner it might be urged, that as from the earliest periods after the flood, we read in Scripture of camels, asses, oxen, sheep, goats, pigeons and doves, being in a state of domestication, a strong probability would seem to rise that all these species had been reserved to himself by man from the period of the descent from the

54. Capt. Hutton has, at least, here shewn satisfactorily, the great historical antiquity of the Doomba race of domestic sheep, by proving it to be the variety (and it would seem the only variety, as to this day in Afghanistan,) tended by the Hebrew Patriarchs, and familiarly referred to in the Mosaic writings.—*Cur. As. Soc.*

Ark, and therefore that none of them have now, in a state of freedom, the original stock from which they sprung.

It should also be remembered, that if the animals at present distributed over the earth, *are all to be considered as having descended from the Ark*, (which I deny,) we ought rather to seek among our domestic breeds for the original stock from whence they have become diffused, than that the converse should be the case; for it can scarcely be supposed with any show of reason, that man, who had once held every species in captivity under his immediate controul, would have suffered them to escape and roam over various quarters of the earth, until they had become wild and difficult of approach, and that then he should have turned his attention to the means of recapturing and reducing them again to subjection.—If, therefore, any of the existing wild breeds of oxen, sheep, or goats are identical with our domestic species, (which is not proved,) it should rather be supposed that the *former* had descended from the *latter*, and that they gained their freedom after the flood, when the then existing families of men had selected from among them a sufficient number to serve as the foundation of their domestic flocks and herds.[55] But as the Scriptures declare, that only *seven pairs* of each of these animals were preserved alive, and as we read that some of each kind were sacrificed by Noah on his descent from the Ark, it becomes very improbable that any of them regained their freedom, and consequently the domestic breeds of camels, goats, asses, oxen, sheep, and some others have descended from stock which lived before the flood, either wild or in a state of domestication. Therefore, we perceive that neither can our domestic breeds be traced to any of the wild stock of the present day, nor can the latter be traced from them; and the wild races are consequently distinct as species, and have been created since the flood;—of this however more will be said elsewhere.

The treatment of the flocks in Afghanistan appears in many respects very similar to European methods. One ram is reckoned sufficient for a flock of a hundred ewes. At the rutting season the ewes are kept in an enclosure and passed to the rams until all are served, the shepherd assisting in the operation by holding up the tail, without which it

55. The writer of the article 'Sheep,' in the 'Penny Cyclopœdia,' alludes only to the Moufflon and Argali (*O. musimon* and *O. ammon*,) among wild races; absolutely stating of them, that "They are descendants of those which have escaped from the dominion of man, and are retreating from desert to desert in proportion as the population of the country increases." ! ! !—*Cur. As. Soc.*

is asserted the animals cannot consummate. When all have been passed to the male in succession, the rams are turned in with them, and should any ewe have been passed over or not served, the ram detects her by the scent. The rams selected to serve are fed up with barley and melon-rinds, and in the autumn, which is the rutting season, they are rendered furious with lust. Another mode of treating them is, to turn the rams out with the flocks in the autumn time, when those ewes which are ready for the male will leave their food and follow him about, upon observing which, the shepherd separates them and puts them to the serving ram.

In the spring months, the young are yeaned at the very season when the grass is again springing up. Some females come in heat after yeaning, but they are never served then, because the young would be dropped at the end of the year when the grass is fading: when the lambs are born, the mother is milked to prevent the lamb from tasting the first milk, which the Afghans reckon to be injurious;[56] after this the lambs are allowed to suck sparingly in the morning and evening, and after the third day, they are all flocked together during the day, and only allowed access to the mothers at sucking-time; the surplus milk is manufactured into *croot* and *ghee*, as cows' milk is not much esteemed by the Afghans. If the rains of winter have been plentiful and the spring grass is in consequence abundant and rich, the lambs are allowed to suck for four months, as the milk is good; but if the contrary has been the case, the lambs are taken up at three months old, in order that they may not weaken the mother.

I was informed by a person who possessed large flocks, and who had no reason to deceive me, that sometimes the tail of the Tymunnee doombas increased to such a size, that a cart or small truck on wheels was necessary to support the weight, and that without it the animal could not wander about; he also declared that he had produced tails in his flock which weighed twelve Tabreez-i-munds or forty-eight seers puckah, equal to about 96lbs. It has been remarked by Fred. Cuvier, that the fat of these tails, when melted, does not return on cooling to the state of fat, and this assertion is a fact well known to the Afghans, who sell and use it mixed with the ghee formed from milk. Some objections were on this account offered to the ghee by our sepahees, but their scruples soon vanished.

56. The reverse is the opinion in Europe.—T. H.

For particulars regarding the wool of these sheep, I must refer the reader to a former paper, published in the Journal of the Asiatic Society of Bengal, No. 99, and likewise to some very pertinent remarks by Dr. Griffith, in the 120th No. of the same Journal.[57]

No. 47. *Capra megaceros*, (mihi. For remarks on this species, see McClelland's 'Journal Nat. Hist.') This I consider to be a true wild species, and not an accidental race as you suppose. It is the "*Markhore*," or snake-killer of the Afghans.[58]

No. 48. *Capra ægagrus*: "*Booz*," of the Afghans: Ibex, of writers on Afghanistan.

I have nothing to add to my former notice of this animal in McClelland's 'Journal Nat. Hist.:' the experiments, however, which I was making on the cross between it and the domestic goat, have all failed hitherto, in so far as the production of offspring, *inter se*, is concerned. I brought from Candahar a half-bred female, the produce of a wild female by a domestic male; this female was again crossed by a tame goat, and brought forth two fine male animals, by one of which she subsequently had kids which lived and grew up; none of her offspring however, have as yet bred *inter se*, and most of them, together with the half-bred mother, are now dead; I have still a few of the young ones left, and shall notice any produce that may occur from them. As yet, however, we have gained nothing in regard to the opinion that the *ægagrus* is the original stock from which our domestic breeds have

57. They are sometimes four or five-horned, but this is only an exception, not a general rule, as some accounts would have us believe.—T. H.

58. In my description of the spiral horns of this animal, *Proc. Zool. Soc.* 1840, p. 80, I made a grand mistake in stating the spirature to be inwardly directed, as in all spiral-horned *domestic* goats; the fact being, that in the *Markhore*, as in every other species I know of, which has spiral horns in its natural wild state, (*e. g.* the Indian Antelope, the Addax, Koodoo, and Caffrarian Impoof,) the twirl is in the opposite direction. Capt. Hutton mistook my meaning in his remarks, (*Cal. Journ. N. H.* II, 541,) upon the "*inward tendency*, at least at the tips," which I mentioned as being almost invariably observable in the endlessly diversified races of domestic goats; supposing that I intended the convergence generally observable towards the tips of the long arched horns of the majority of wild *Capræ*,—a character of very trifling importance, even if constant, which it is not. And I may here also remark on the subject of the Himalayan Ibex (*Capra sakeen*, nobis), of which my notice was briefly commented upon by Capt. Hutton, that, in addition to the differences which I indicated as distinguishing its horns from those of the Swiss Ibex, the existence of a well developed beard (four inches long, in the head of a young male in the Society's Museum,) affords a conspicuous differential feature; for the beard of the Swiss Ibex is constantly reduced to the merest rudimentary tuft, such as would remain unnoticed if not specially looked for.—*Cur. As. Soc.*

sprung, but as far as experiments have been carried, strong doubts arise in my mind as to the correctness of such a doctrine.[59]

No. 49. Domestic goats. The domestic Goats of the Afghans are chiefly long-haired, with an under-coat of fine soft down. They very much resemble the Goats of the lower Himalaya and Kooloo, and appear to be a degenerate breed or perhaps variety of the true Shawl Goat. The prevailing colour is black, or parti-coloured.

No. 50. *Camelus dromedarius.* The Dromedary or Arabian Camel. "*Shootur*," of Persians, &c.[60]

59. *Capra ægagrus* is stated by Menetries to be "not uncommon on the Caucasian Alps, seldom if ever descending below an elevation of 1000 feet, and then not in consequence of severe weather." It appears to be generally diffused over the mountains of Persia and Asia Minor, and the adjoining regions of Western Tartary. The London Zoological Society possess a fine specimen of it from the vicinity of Erzeroum. The finest pair of horns of this species which I have seen, is in the British Museum. They measure four feet and a quarter over the curvature, and diverge to sixteen inches apart where widest, not very far from the extremity, the tips returning to fourteen inches of each other: basal circumference nine inches; and depth inside three and three-quarters: they number ten years of growth. It is not usual, however, for this species to exceed three feet and a half in the length of its horns, though these are not unfrequently four inches, or even more, deep at the base.—*Cur. As. Soc.*

60. The two species of Camel are better denominated the one-humped and the two-humped Camels, and the name 'Dromedary' (from δρομας) should be restricted to the swift-running breeds which occur of both of them. Hitherto, the Camel and Dromedary have been continually spoken of as distinct animals, sometimes the one, and sometimes the other, bearing either name. Thus Burkhardt refers to the two-humped species by the name dromedary, when he affirms that "the Armenian or Caramanian camel is produced by a he-dromedary and a she Arab camel. The people of Anatolia," he adds, "keep their male dromedaries to breed with the females of the smaller Arab race, which the Turkomans yearly bring to market. If left to breed among themselves, the Caramanian camels produce a puny race, of little value." ('Travels in Nubia,' p. 232.) By the French writers more particularly, the one-humped species (having indeed been termed *C. Dromedarius* by Linnæus,) is commonly styled the Dromedary, as Capt. Hutton also designates it. The mixed race was long ago described by Oleareus, as "a hybrid between the male two-humped and female one-humped camels. They are the most esteemed of all, so much so, that some sell (in Turkey) at 1,000 crowns a piece. They carry 900 or 1,000 weight, and are in a manner indefatigable. They are muzzled. The camels which come of these degenerate very much, and are heavy and slow, being not worth more than 80 or 140 crowns." At Aleppo, the usual price of one of these hybrids is double that of an Arab camel: they are extensively employed in Turkey and Persia; and Sonnini observed a few in Egypt, where they are still rare. These hybrids are, I believe, always of the dark colour of the male, or two-humped parent. The common Indian race, which is diffused hence westward to Senegambia, appears to be constantly of a pale colour in this country; and it is perhaps only the *Dromedary*, or fleet race of it, which is occasionally variable in hue. Thus, in Arabia, we are informed that a lady of Nadja considers it a degradation to mount any other than a black camel, while an Ozanian beauty prefers one that is grey or white. In the continuation of Clapperton's Journey by Lander, we are told of the arrival of 500

The Camel with one hump is in use throughout Afghanistan, but is of a much more robust and compact form than our Indian variety, and well suited to the hilly regions it often has to traverse.

Nothing can be more erroneous, however, than the common belief that the Camel is a hardy animal; so opposed to this is the Afghan opinion, that they used to exclaim with astonishment at the indifference generally shown by us to the comfort of this useful creature. They were often heard to say, "you take immense trouble, and incur great expense in pampering *your men* and *horses*, but the camel is altogether neglected, although if you wish him to thrive and do his work, you must both feed him well, and clothe and house him too, in winter and in wet weather." In every case where practicable, they acted up to this advice themselves, and no sooner does an Afghan cafilah come to its ground after a march, than *the camels are seated round a heap of leaves, straw or grain.* With us, on the contrary, our poor brutes after wandering along from four o'clock in the morning till two or three o'clock in the afternoon, with heavy loads badly fixed upon their backs, no sooner arrived in camp than they were turned out to pick up a morsel around the tents over stoney plains, which produced scarcely any plants of sufficient size to furnish a bite even for sheep, and after a couple of hours passed in an ineffectual search for food, the starving brutes were driven back to camp, and tethered for the night, in most instances without a particle of grain or other food. What wonder then that dozens could not rise beneath a load on the following morning, and were left to be the prey of ravens or the prize of the almost as ravenous Afghan! Let those who prized their cattle, and made some efforts to clothe and feed

camels laden with salt from the borders of the great desert, which "were preceded by a party of Tuarick merchants, whose appearance was grand and imposing. They entered all full trot, riding on handsome camels, some of them red and white, and others black and white." ('Clapperton's' 2nd 'Expedition,' p. 266.) These parti-coloured individuals remind us of the Peruvian Alpaca. In Arabia, and in all northern Africa, much attention is bestowed upon regulating the propagation of the best sort of camels, but especially of the lighter kinds or dromedaries,—termed *Asharry* and *Mahairy*, in Barbary. "Those of Oman," writes the late Lieut. Wellsted, "enjoy a deserved celebrity for strength and swiftness. Nejd is equally the nursery of the camel as of the horse; but the Omary, in all ages, is celebrated in the songs of the Arabs as producing the fleetest; their legs are more slender and straight; their eyes more prominent and sparkling; and their whole appearance denotes them to be of higher lineage than the ordinary breed of the animal." ('Travels in Arabia,' II, 291.) The smallness of the head is a conspicuous and characteristic feature of a true dromedary.—*Cur. As. Soc.*

them on the march, speak as to the benefit they derived from their humanity; camels thus cared for, were brought in safety and in health from India, and again returned to it after marching through the country, and passing through the first campaign.

Numbers of camels that were abandoned on the line of march every morning, from their inability to carry a load, were afterwards hawked about for sale by the country people who had housed, fed, and recovered them. This I know to be a fact, for being in the Shah's commissariat at Candahar, I purchased several of them. That the animal is patient under privations, and will endure to the death, is quite true; but his constitution is tender, and his power of endurance, unless well fed and cared for, is not equal to that of the horse. Rest, food, and warmth, in a word—*comfort*, is more necessary to the camel than to his cruel lord and master.

The Dromedary of Central Asia differs much in its external characters from the animal domesticated in India. In the former we perceive a shortness and a strength of limb, and bulk of carcase, which form a marked contrast to the tall and stately "desert sheep" of India; the one is a short, thick-set, powerfully-made animal, well clothed with a thick close curly hair, to protect it against the cold of winter; the fore-arm often enormously thick and muscular; the hump rounded and compact, and *on a level with which the crown of the head is almost invariably carried.*

The other is a tall, long-limbed, long-necked animal, which placed beside its congener of Korassan, reduces the latter to a mere athletic dwarf;—the thick coat of hair is wanting or considerably reduced, and the head is carried high *above the hump.* Yet notwithstanding the marked dissimilarity in their general configuration, the two animals can only be regarded as varieties of the same species, the differences observable being, I think, solely attributable to climate, domestication, and the different circumstances under which both individuals are placed. I am aware, that in advocating the agency of climate and food, as the great causes which have served to modify the species, I am in a measure reviving an exploded doctrine, yet I am not sure that absolute rejection of the doctrine is altogether warranted or wise; for Cuvier himself declares, "that the wild herbivorous animals feel the influence of climate somewhat more extensively (than the *carnivora)*, because there is added to it in their case, the influence of the food, which may happen to differ both

as to quantity and quality. Thus, the Elephants of one forest are often larger than those of another; and their tusks are somewhat longer in places where their food may happen to be more favourable for the production of ivory."[61]

Now, precisely the same remarks will apply to the camel, and while, in a country deficient in woody productions, the animal is of small stature, the very reverse is found to be the case in India, where the camel browses entirely on leaves and woody branches favourable to his growth. Every consideration tends to point out to us, that the Indian dromedary is not in its original country, and that adapted as it is by nature for existence in the dry and sandy plains of an arid region like Arabia, its occurrence at all within the influence of the monsoons, is entirely to be attributed to the agency of man, who has brought it with him in a state of domestication from the Postdiluvian focus of diffusion, across mountains and broad rapid rivers, which in its natural state of freedom would have formed insuperable barriers to its further progress eastward, than the long range of mountains extending downwards from the great northern chain through Beloochistan even to the sea, forming a well-worked natural boundary between India and the states of Central Asia. The camel of Korassan is formed for grazing in a country where its food is gathered from the ground, and where it has to perform long journeys through mountain passes and defiles; its shortness and strength of limb are therefore well adapted to its mode of life, and the severity of its climate; while on the other hand, the Indian variety having a range of long and almost interminable level country to travel over, where its chief food consists of the leaves and tender branches of trees, has become modified by domestication to meet the circumstances of its present condition, and thus its limbs are less powerfully built, its body less clothed with hair, and its proportions adapted to reach the food by which the change has been effected, and in which it delights.

Much has been said regarding the existence or non-existence of this animal in a state of freedom, and as yet all tends to prove that neither the camel nor the dromedary have been known wild since the present historical era commenced. It can scarcely be thought possible, that animals of such magnitude as these, can be still living wild in herds upon any country of the known earth, and yet that they should have eluded the researches of naturalists; for although it has been stated by

61. Cuvier's 'Theory of the earth.'

some of the older writers, that in their times the camel was found in the regions of Tartary, yet as their accounts have been corroborated by no later travellers, and as I feel assured, from information carefully collected during a two years' residence at Candahar, from traders to Bokhara and other neighbouring states, that none are found wild in our days, it is most probable that the herds described as once existing in a state of freedom within the modern era, were either as Cuvier has suggested, individuals let loose from religious motives by the Calmucks, or that they were troops of young or even fold animals, turned out to graze together in the breeding districts, as is the custom where pasture is plentiful and the animal not required for immediate labour. This conjecture would more particularly apply to the two-humped or Bactrian camel, which, from its constitution being suited more especially to the cold regions of the northern Steppes, is unable to perform long journeys southward during the heats of summer, and they may therefore be left at that season to roam and feed in herds upon the plains of the Khuzzak country to the north of Bokhara, which appears to be the proper habitat of the species, until the winter setting in again enables them to travel with kafilahs of merchandise, into Russia and other states. It is very certain, however, that if the camel seen by the old authors, or even by Mr. Trebeck, in his tour to Ludak,[62] was on the Steppes of Tartary, it could have been no other than the Bactrian species, for the Arabian camel would be wholly unable to endure the rigours of the climate in those northern latitudes. Balkh and Bokhara, appearing by all accounts to be the most northern limit in which it can live, and even there it requires the greatest care and the comfort of warm clothing and shelter, to enable it to survive the cold of the winter months. Thus, after all, even if the Bactrian camel could be proved to have been wild within the historical era, we should still require proof that the dromedary had been so found, and as all the arguments hitherto have had reference to this last species, we are still authorised in believing that it at least has never been known to man in a state of natural freedom since the present order of things commenced.

From strict and careful inquiries instituted during a two years' residence in Afghanistan, through traders of all classes who were in the constant habit of travelling into the Tartar countries, as well as through some Khuzzak camel drivers, I am unhesitatingly inclined to adopt the

62. Vide Editor's Note.—Journal As. Soc., No. F.

belief, that neither the one nor the other camel exists wild at present, or has done so since the flood of Noah. The late Sir A. Burnes, with whom I corresponded on such subjects, replied to one of my last letters as follows: "Caubul, 25th May, 1841. I have never seen or heard of the camel being wild, nor do I credit the report if from Moorcroft; but that the animal, at some time or other, must have been, like all other animals, in a state of nature is clear, though certainly not in the historical era: the natives all say the same." This was written in answer to repeated inquiries from me regarding the existence of wild camels in the northern Steppes; and Sir A. Burnes, after a careful examination of all who were likely to throw any light upon the subject, came to the only conclusion that any one can arrive at, namely, that neither species has been known to *Postdiluvian man*, in a state of freedom.

This species *(C. dromedarius)* is not only useful as a beast of burthen to travel with merchandise, but yields a soft and durable wool, which is converted into cloth. In the valley of Pisheen, I have likewise seen them yoked together in the plough, and compelled to till the ground.

No. 51. *Camelus bactrianus*.—Two-humped camel. "Bagdad-i," of Afghans.

This animal is too impatient of heat to undergo even the climate of Candahar for more than a year or two. His true habitat is in the Khuzzak country; he is found in cafilahs which journey to the south, but is not kept in Afghanistan. While this two-humped species cannot undergo the heats of the south, the dromedary on the other hand cannot endure the rigours of the north. To obviate the inconvenience which might arise from this circumstance, the Afghans, or rather the tribes of the northern Steppes, have produced a crossed breed between the two animals, which is enormously powerful and of large stature. Its general appearance varies according as the dam has been a camel or a dromedary, and it is asserted, that if the hybrid animal is *born* in the northern Steppes its constitution unfits it for a continued residence in a hot country, while on the other hand, if born in a warm climate, it cannot endure a great degree of cold. This circumstance is worth attending to, since I heard of several persons, who were anxious to introduce the hybrid into India, in order to strengthen our dromedaries. The cross however, should be obtained from the camel and female dromedary, and the produce be born in our own provinces, if the assertion of the Afghans is to be relied on. I do not think, however, that any good

would result from crossing our breed, which is admirably adapted to the Indian climate and the work it has to perform, and we may perhaps in this case, follow with advantage, the old adage of "Let well alone."

The species said to exist among the Kirguise, and supposed to be distinct from the two forementioned species, is, in all probability, nothing more than the hybrid obtained from the camel and dromedary. I heard of no instance of the hybrids breeding *inter se*, but at the same time I do not consider the point decided, or even of consequence, either one way or the other; as the fact of hybrids breeding inter se cannot prove identity of species in the original parent stock, since I have more than once obtained and reared offspring from hybrid birds, which offspring moreover again bred *inter se*. Yet, notwithstanding this, the original species were distinct, being the one a female canary, and the other a common linnet. Such being the case, it must be evident that if the offspring of the domestic goat and the wild ægagrus were proved capable of breeding *inter se*, it would not show that the wild and domestic breeds were identical!

In respect to the stock from which the camels originally descended, I hold the same opinions as those set forth in regard to the domestic sheep and goats, namely, that they never had, during the historical era, any wild representatives, the whole having been retained by man after the exit from the Ark. The camels, therefore, like most others of our domestic cattle, I hold to be species whose original stock perished in the waters of the Noarchian deluge. These opinions will elsewhere lead me to remark upon the habitats of the modern camels, with a view to ascertain whether both could have spread from the focus of Postdiluvian diffusion, or whether the country of Armenia be in reality the true resting place of the Ark, a point on which I am inclined to be sceptical.

No. 52. *Sciurus palmarum*.—The Palm Squirrel.

This little animal is found in the Bhawulpore country, and extends into the jungles of Cutchee as far as the borders of the "*Putt*," or desert between Poojaun and Burshore. It does not appear to cross that desert, and is not found in Afghanistan.

P. S.—I think I may venture to say, that very few wild mammalia occur below Ghuznee, which have not been here noticed, and those will probably be small species.

In the northerly mountains of Cabul, &c. doubtless many are found, but as my personal observations were confined to the neighbourhood of

Candahar and the route to that city, I shall not venture further on the subject. I do not think, however, that any large ruminants will be found even there.

I will send you a notice of the birds collected also.

These notes are not arranged in order, but that you can easily rectify. I have been obliged to write them for you as I could lay my hands on my old memoranda, which have become confused. You are at liberty to describe, and name any species that may appear new.

THOMAS HUTTON.

Additions and corrections to former Notes, Vol. XIV, p. 340 et seq.

NOTE 2, p. 341.—With reference to the range of the Tiger on the Himalaya, I should have quoted the Rev. R. Everest's paper 'On the power of enduring cold in the mammalia of hot countries,' published in *An. and Mag. Nat. Hist.*, VIII, 325. "The Tiger," remarks that gentleman, "is very scarce in the Himalaya, even in summer time, being too large and unwieldy an animal to follow the caprine races over the precipitous ground. I, however, met with their tracks on the snow near my house; and while shooting in the oak-forest, from 5,000 to 6,000 feet above the sea, had one of my people carried away by one. They can go wherever the [Jerrow (*Cervus Aristotelis*,)] can obtain a footing, and remain on a mountain north of Mussoorie, (Nagtiba, near 10,000 feet in height,) all the year round. They live principally on stags and also bears."

NOTE 6, p. 342.—Prof. Behn, of Kiel University, and now with the Danish expedition on board the Galathea, pronounces this to be distinct from the European *Felis sylvestris*. The state of the skin does not permit of a satisfactory description being taken from it; but it may be briefly characterized as of a light fulvous colour, mottled or varied with blackish on the back, which colour forms somewhat large, transverse, ill-defined stripes on the sides and limbs, and more distant spots on the under-parts: the tail tapering, with five or six rings of black, and a black tip; and the fur moderately long and dense. Length about two feet, the tail a foot more. If new, *F. Huttoni*, nobis.

NOTE 8, p. 343.—"The Afghan pointer," remarks the late Major Brown, "has been long known, having occasionally been brought down for sale by the fruit-merchants; but they have never been considered equal to the English dog. In Afghanistan they are called *Boders*, and are used for shooting pretty generally throughout that country, including Cashmere. They have rather a coarse heavy appearance, and the one now described resembles a Beagle a good deal; otherwise it has much the appearance of an India-bred English pointer. The hair is smooth, of a red and white colour: it stands short on the legs, with a large double dew-claw on each hind-leg, which has a very ugly appearance. Its ears are well hung but short; the breadth at the forehead is great, but the muzzle small, and it has great natural courage. Apparently it has never been broken in, and some large scars about the head testify that it has fought some hard battles in its day." 'Gunga,' in *Bengal Sporting Magazine*.

NOTE 15, p. 346. *Mangusta pallipes*. Since the note referred to was written, the Society has received specimens of *M. Edwardsii* (apud Ogilby) from Agra, which render it extremely doubtful whether the Afghan species can be considered more than a variety of the same: upon comparison of the skulls, however, the first false molar of both jaws is much smaller in Afghan than in Bengal specimens. The last appear

always to be of a much darker and browner colour, resembling those from Nepal—*M. auropunctata* of Hodgson, which name will, I believe, stand.

Notes 19 and 20, p. 352 *et seq.* Hedgehogs. The Indian species of this genus are still much in need of investigation. Four have received names, as follow:—

1. *E. collaris*, Gray: founded upon Gen. Hardwicke's figure of a specimen obtained in the 'Dooab.' This is represented to have uniformly blackish spines, rather large ears, which are greatly emarginated posteriorly, a blackish face, more rufous chest, and a narrow band of pure white on the throat, commencing from the ear. In Mr. Gray's recent catalogue of the mammalia in the British Museum, three specimens referred to this animal are enumerated, one of them from Madras, presented by Walter Elliot, Esq.

2. *E. spatangus*, Bennet, *Proc. Zool. Soc.* 1832, p. 123.

3. *E. Grayi*, Bennet, ibid. p. 124. Both from the Himalaya, and referred "to that extra European form of the genus *Erinaceus*, which is distinguished by the possession of large ears."

4. *E. mentalis*, Gray; "Black-chinned Hedgehog," from the Himalaya.—Seemingly undescribed, being merely enumerated with the preceding three in Mr. Gray's catalogue of the British Museum mammalia.

Capt. Hutton's No. 19, from Afghanistan, to which I gave the provisional name *megalotis*, would seem to approximate the *E. spatangus;* but the difference of size is too great to admit of the probability of their being young and adult of the same, the advanced dentition of Mr. Bennet's specimen leading him to suppose it "probably not fully adult, there being only two false molars on each side of the upper jaw." The head and body of *E. spatangus* are given as but three inches and a quarter, tail a quarter of an inch, ears three inches and a quarter, and tarse to end of claws an inch. Capt. Hutton's recent Afghan specimen is described as about a foot in length, minus the tail, the latter measuring an inch and a half. (?) The example of it sent, is about the size of a moderately large European Hedgehog, with great ovate ears, an inch and a quarter long, and seven-eighths in extreme breadth: tarse to end of claws an inch and a half, tail but five-eighths; entire length of skull, with projecting upper incisors, two inches and a quarter.

Of Capt. Hutton's No. 18, the first and second specimens mentioned by him are, I suspect, rightly referred to *E. collaris:* but his third specimen seems, from the description, identical with one in the Society's museum, the locality of which is unknown, and also with others from S. India, obligingly sent me on loan by Mr. Elliot, and to which I suspect that Mr. Gray's 'Madras' specimen (presented by Mr. Elliot,) and probably the two others referred by him to *E. collaris*, likewise appertain. The crania and dentition of an adult sent by Mr. Elliot, and that of the Society's specimen, correspond exactly: but Capt. Hutton's skull of the Bhawulpore Hedgehog presents some differences; the general form is rather shorter and broader, it is more constricted between the orbits, and the zygomæ are considerably more projecting; the small upper pre-molar anterior to the scissor-tooth is less minute; and in the lower jaw, the second lateral pair of incisors from the front are much smaller, as indeed are also the next or last pair of the true incisors. If new, I propose to call this species *E. micropus.*

Another Asiatic hedgehog, additional also to *E. auritus* of Siberia, and nearly allied to the European species, is *E. concolor*, Martin. *P. Z. S.* 1837, p. 103, described from a specimen received from Trebizond.—*Cur. As. Soc.*

एसयाटिक् सोसाइट् संस्कृत नागराक्षर ॥

महाभारतं आद्यन्त ४ खण्ड	४०
महाभारतीयान्तर्गतसूचीपत्रं आद्यन्त ४ खण्ड	६
नैषध आद्यन्त सटीक् १ खण्ड	६
हरिवंश आद्यन्त १ खण्ड	५
राजतरङ्गिणी आद्यन्त १ खण्ड ...	५
सुश्रुत आद्यन्त २ खण्ड	८
सूची पुस्तकं १ खण्ड	१
लासनेन रचितं सर्व साधारण	४
गीतगोविन्द् १ खण्ड	२॥
यज्ञदत्तवधः १ खण्ड	२२॥
शकुन्तला नाटक्	१०

فهرست كتابهاي عربي وفارسي مطبوع كه در خانهٔ اشياتک سوسيتي حسب تفصيل الذيل بقيمتهاي مناسب براي فروخت موجود اند

اسامي كتب				قيمت
فتاوى عالمگيري مرتب بشش جلد في جلد				هشت روپيه
عنايه جلد ثاني وثالث ورابع في جلد			...	هشت روپيه
شرائع الاسلام	...	...	...	هشت روپيه
انيس المشرحين	...	...	...	پنج روپيه
جوامع علم رياضي	...	...	...	چهار روپيه
اصطلاحات صوفيه	...	...	...	پنج روپيه
خزانة العلم	...	...	...	هشت روپيه
تاريخ نادري	...	...	...	هشت روپيه

فهرست كتب كالج فورت وليم واشياتک سوسيتي يكروپيه

The stated monthly meeting of the Society was held at the rooms at ½ past 8 P. M. on Wednesday the 4th February.

The Rev. Dr. Hæberlin in the chair.

The following new member, proposed at the last meeting, was balloted for and declared duly elected :

Lord Arthur Hay.

And the following gentlemen were proposed :

Lieut. T. C. Blagrave, 26th N. I. (Scinde.)

Lieut. C. E. Burton, 46th N. I. (Scinde.)

Both proposed by Mr. Piddington and seconded by the Secretary.

The Proceedings of the January meeting were read, and with some alterations and additions confirmed, it being understood that a Protest made by Capt. Marshall be withdrawn, and that a note be substituted satisfactory to him on the subject of which he complained.

Read the following list of books presented, purchased and exchanged.

List of Books received for the Meeting of Wednesday the 4th February, 1846.

PRESENTED.

1. Meteorological Register for November and December, 1845, from the Surveyor General's Office.

2. The Oriental Christian Spectator for January, 1846.—By the Editor.

3. The Calcutta Christian Observer, for February, 1846.—By the Editors.

4. London Edinburgh and Dublin Philosophical Magazine and Journal of Science, No. 181, for November, 1845.—By the Editor.

5. Bulletin de la Societe de Geographie, tome III.—By the Society.

6. Hindu System of Medicine, by T. A. Wise, Esq., M. D.—By the Author.

7. Selections from several books of the Vedanta, translated from the Original Sanscritta, by Raja Rammohun Roy.—By Babu Kissory Chand Mittra.

8. Introduction to Vajasoney Oopanishad.—By Babu Kissory Chand Mittra.

9. Discourse read at the third Hare Anniversary Meeting.—By Babu Kissory Chand Mittra (2 copies.)

10. Bengalee tract on the power, wisdom and goodness of God.—By Babu Kissory Chand Mittra.

11. Notice Sur l'Establishment Geographique de Bruxelles par M. Drapiez.—By M. D. Vander Maelen.

12. Etudes Sur l'Histoire primitive des Races Oceaniennes et Americanes par Gustave D'Eichthal.—By the Author.

13. Histoire et Origine Des Foulas ou Fellaces par Gustave D'Eichthal.—By the Author.

14. Grammar Persanne de Sir W. Jones.—By M. Garcin de Tassy.

15. Catalogue de l'Etablissement Geographique de Bruxelles.—By Ph. Vander Maelen.

16. The Universal Atlas of Geography Prospectus.—By Ph. Vander Maelen.

17. Atlas de L'Europe, Prospectus.—By Ph. Vander Maelen.

Purchased.

18. Edinburgh Review, from No. 1 to 166 (with the exception of two Nos.)

19. The North British Review, No. 7. November, 1845.

20. The Annals and Magazine of Natural History, No. 106, November, 1845

21. Hurreebhuctee Bilas (2 copies.)

22. The Birds of Australia, parts 1 to 19, by J. Gould, F. L. S.

23. Journal des Savants, September, 1845.

Exchanged.

24. Journal Asiatique, Nos. 25 and 26, for July and August, 1845.

25. Proceedings of the Geological Society of London, Vol. 4, Nos. 102 and 103.

26. The Athenæum, Nos. 939 to 944.

27. Journal of the Agricultural and Horticultural Society of India, part 4. vol. IV.

Read the following letter from Dr. Wise :—

To H. Torrens, Esq., *Secretary, Asiatic Society.*

My dear Sir,—With this note you will receive a copy of my Commentary on the Hindu System of Medicine, which I request you will do me the favor of presenting to the Asiatic Society.

Thos. S. Wise.

Dacca, 27th January, 1846.

Dr. Hæberlin, who stated that he had read the work, and was acquainted with the original Shastras from which it was compiled and abridged, and Mr. Piddington who stated that in the absence of Dr. Wise in Europe he had corrected a great deal of it for the press, and had since read the remainder, both spoke in terms of high commendation of this book, as one requiring great labour, long and careful research, and talent and perseverance of no common order to produce ; and which for the scientific man, the physcian and the philosopher, and for all who had not access to, or could not read the often rare and valuable works which Dr. Wise has consulted, would be quite invaluable.

The Secretary suggested that a work of this kind would be highly gratifying to many of the Society's correspondents both oriental and scientific, if presented to them, as usual with the Society's own publications.

It was therefore proposed by Dr. Hæberlin, seconded by the Secretary, and carried unanimously :

That the Society do purchase 30 copies of Dr. Wise's work for presentation to its correspondents.

The Secretary was requested to communicate with Dr. Wise as to the price.

Read a letter from the Society's London Agents announcing shipment and enclosing Bill of Lading for 3 cases and 1 bundle specimens of Natural History from the Royal Academy of Christiana, per ship Persian, Capt. Edington.

Read the following letter :

Henry Torrens, Esq., *Secretary to the Asiatic Society of Bengal.*

Sir,—We have received your favor of the 3d September, ordering us to return to India about half of the stock of the Asiatic Researches received from Mr. John Murray in March, 1844.

We have had the volumes named in your letter divided into equal proportions, in case of accident to the vessel, and have shipped one portion packed in six cases by the *Euphrates*, Capt. Wilson, and for which we beg to enclose you a Bill of Lading. We annex a memorandum of the cost of the cases and the shipping expenses upon them amounting to £18-2-0—which sum we shall place to the debit of the Society. The Researches were received from Mr. Murray in sheets and in the absence of instructions we have not thought it advisable to subject the Society to the expenses of boarding so large a number of volumes without orders to that effect.

The shipment has not been insured, but should you think it necessary it can be done in Calcutta, upon the receipt of this advice, nearly as cheap as it could have been effected here.

The second portion of the Researches will be forwarded by the next vessel for Calcutta. Should you think it necessary to effect it, insurance on both shipments may be done at the same time, as the next will be a duplicate of the present.

We shall be obliged by your saying what we are to do with the Researches that will, after the second shipment, still remain in our hands. We have some time since expressed our inability to dispose even of one set, and were the Researches advertised we fear the result would not be satisfactory. We shall have no objection to continue the care of the Researches, but if we cannot make sales it is only reasonable that we should charge warehouse-room for the books. We shall be

much obliged if you will consider the subject and let us know what you think should be done.

Wm. H. Allen and Co.

London, December 3d, 1845.

Asiatic Society, Calcutta, To Wm. H. Allen and Co.

5	Asiatic Researches,	Vol. 1, 4to.	5	Asiatic Researches,	Vol. 14.
2	Ditto	Vol. 2.	50	Ditto	Vol. 11.
40	Ditto	Vol. 10.	25	Ditto	Vol. 6.
50	Ditto	Vol. 7.	30	Ditto	Vol. 8.
50	Ditto	Vol. 9.	100	Ditto	Vol. 12, 8vo.
7	Ditto	Vol. 13.	13	Ditto	Vol. 12, 4to.

Charges.

Six Cases for packing lined with Tin, 1 to 6, at 33s. each	9	18	0
Packing and examining the same, ...	1	12	0
Entry, Cartage to the West India Docks, Wharf Charges, Shipping Expenses and Bills of Lading, ...	2	7	0
Freight and Primage, ...	4	5	0
£	18	2	0

Wm. H. Allen and Co.

Some conversation occurred on the subject of the enquiry and reference made by Messrs. Allen and Co. in this letter, when it was resolved that a communication be made to Mr. König of Bonn, informing him of the number of the volumes of the Researches which would yet remain in London, authorising him, as the Society's continental bookseller, to indent upon Messrs. Allen for such number of copies as he may wish for, and requesting him generally to interest himself and afford the Society his best advice and assistance in the disposal of the home stock.

The Secretary stated that he had purchased, subject to the Society's approbation, a complete set of the Edinburgh Review at the low rate of 1-4 per volume. The purchase was duly sanctioned.

Read the following letter:—

To the Secretary to the Asiatic Society.

Sir,—I am directed to acknowledge with thanks the receipt of your present of Corcoran's Jouhan-i-Akhlak, being the Fables of Esop translated into Oordoo, and to acquaint you that they have been deposited in the Library of the College of Fort William in the name of the Asiatic Society of Calcutta.

G. T. Marshall,

College of Fort William, 12th Jan. 1846. *Secy. College.*

Read the following lettter :—

H. Torrens, Esq. *Secretary and Vice-President of the Asiatic Society.*

Sir,—Herewith I beg to submit a copy of the *Tuzaka* in Original Sanscrit, being a treatise on Astrology compiled by *Neelkantha*, a celebrated Pundit of ancient times, and I hope you will kindly accept it as a present to the Society, and allow it to be placed in its Library.

The work is of a curious nature, as it contains several Arabic words written in Sanscrit character ; such as,

مصلح मुसल्लः Moosullah.
انتها इन्तिहा Intíhá.
اتصال इत्तिसाल Ittisál.
مقبول मक्बुल Mukbool.
غیرمقبول गएरमक्बुल Ghyr Mukbool.
حد हद Hadd, &c. &c.

and I conclude from the system of the Zodiac adopted in it being precisely the same as in the رمل Ramal, or Astrology of the Arabs, that it owes its origin to the Mahommedans ; and the compilation, or rather the translation, must have been made during the time this country was invaded bythem. The work, however, is in much repute in Hindu Society, notwithstanding the religious prejudices of the one being opposed to those of the other, and I therefore presume to offer it as a present on account of its curiosity.

Neelratna Haldar.

Calcutta, the 1st February, 1846.

Read the following extracts from a letter to the Sub-Secretary from Lieut. Blagrave, dated 21st Dec. 1845.

Extracts from a letter from Lt. Blagrave, B. N. I., to the Sub-Secretary, dated Akul ka Got (Scinde), 21st December, 1845.

" Many thanks to you and to Mr. Torrens for the kind interest you have taken with us " young Egyptians ;" your proposition is a most advantageous one for us, and no doubt will be gladly accepted, but I doubt whether for some time yet we shall have ought much worth publishing, but there is no saying, for there are many men in Scinde well qualified to write on different interesting subjects, but at present they have either no time or else no inclination to do so ; the Society was got up by a few of us more for the sake of establishing a Museum at Kurrachee, and eventually good local ones at Hyderabad and Sukkur ; we have got about six and twenty subscribers, and have already got an embryo Museum consisting of a little of every thing, fossils, birds, fish, insects, snakes, &c., &c. I and a few others are going on collecting for it, and I hope that by this time next year we shall have a house and something in it to shew, and then we may hope for more assistance from those that have it in their power to aid us ; but as soon as I receive your next letter, which you say it to be an official copy of your proposition, I will send it down to Kurrachee

and get the votes of the members upon it. Lt. Burton tells me he has received a letter from some gentleman (I forget his name) in charge of your Museum, asking for specimens of the Scinde wolf, foxes, rare birds, fish and reptiles. I will so long as I remain in Scinde take care that a duplicate collection of all specimens shall be made by myself and people, the one set of which shall be forwarded to you, and will write to our Secretary and request him to lay by all duplicate specimens that he may receive for you."

"Should I remain in Scinde, which is doubtful, I shall be stationed at Sehwan, where I hope to make some discoveries among the ruins or rather foundations of the Old Fort. I have got a copy of some inscriptions in Arabic and Persian on some stones found by Capt. Lavie, the Collector there, when digging a foundation for some buildings; the people say they are 600 years old, but as I believe Captain Lavie intends sending or has sent a description and translation of the inscriptions down to our Secretary, I need not forward mine to you, at least until I hear whether he has done so or not."

"By the by, have not you published, or are publishing, the fish of the Indus sketched and collected by Sir A. Burnes? if so, what number have you got? there are an immense number and perhaps you have not all; if you could furnish me with a list of the Native names (I suppose Sir A. Burnes sent them), I should then know whether any that I may collect would be worth sending to you or not."

The Secretary presented, on the part of Edward Wyatt, Esq., Deputy Collector, a Statistical Memoir of the district of Benares.

Owing to the lateness of the hour the Report of the Curator of the Museum of Economic Geology and Geological and Mineralogical Departments was not read.

The best thanks of the Society were voted for the various communications and presentations made.